FOOD MANUFACTURE

Incorporating Food Industries Weekly

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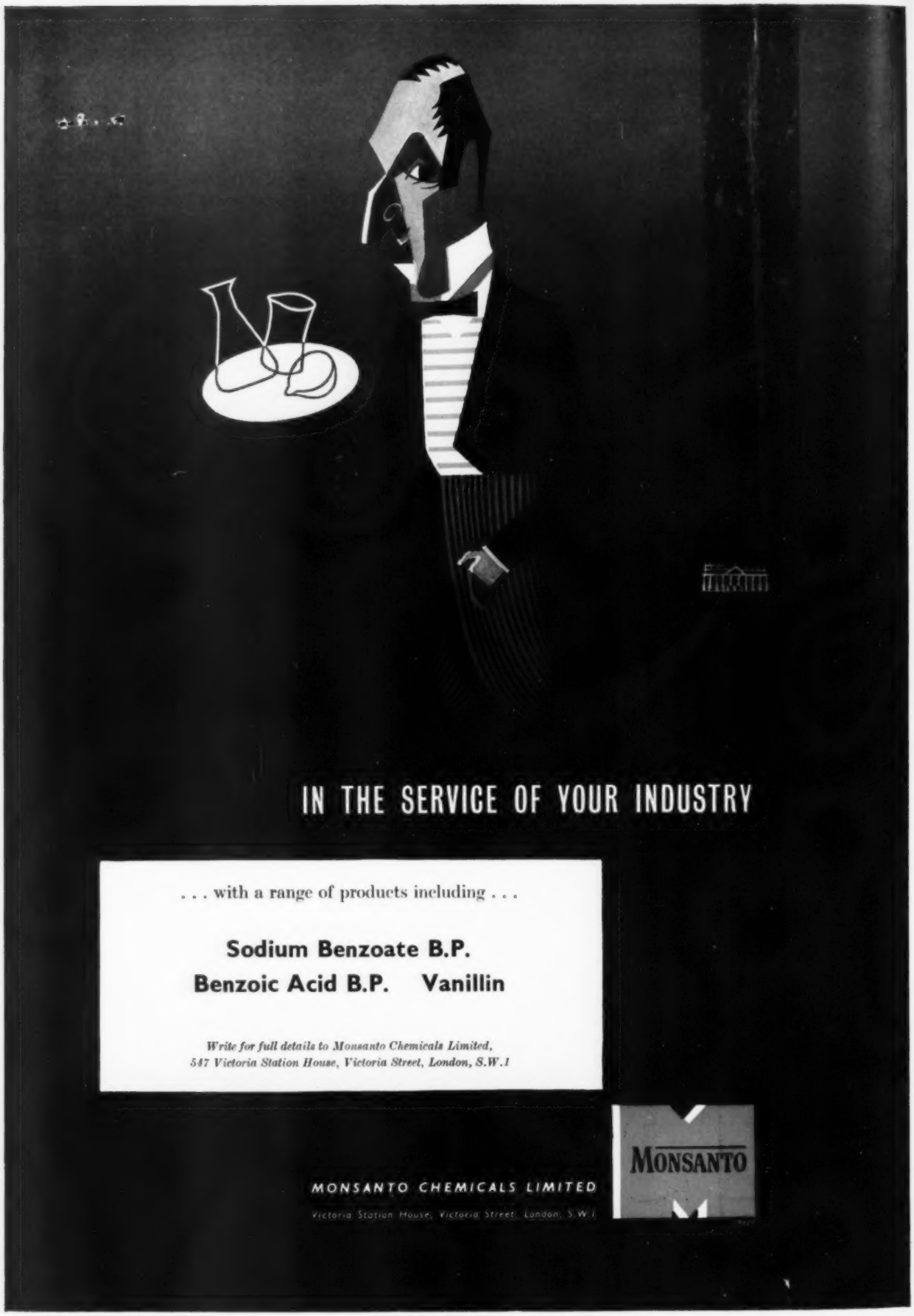
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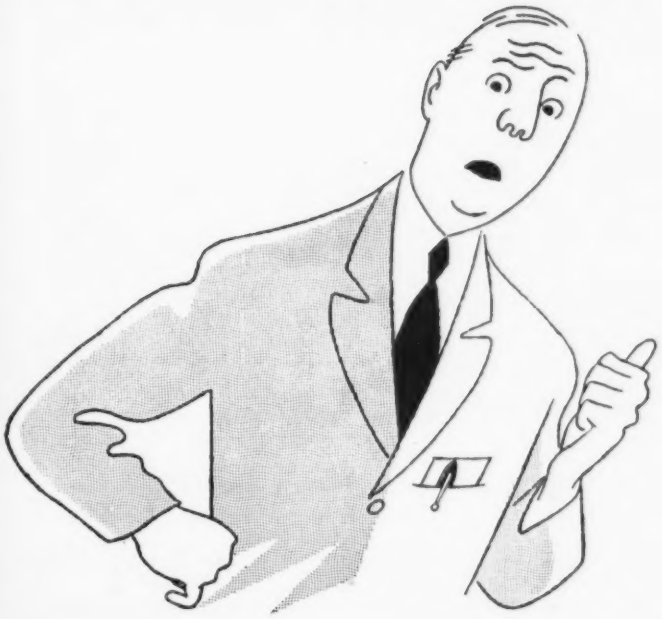

"I told him straight! . . ."

said the Factory Manager

"*I told the Guv'nor straight*," he said, "*— if you want this lot out on time, I want more up-to-date handling equipment!*"

We murmured admiration for his fearlessness . . . then we told him we were from Yale & Towne; we'd been called in by "the Guv'nor" to see how we could help.

"*Well, you can see for yourself the trouble*," he said, with a sweep of his hand. "*Hold-ups here — hold-ups there. We just can't keep the stuff moving.*"

We checked everything that was moved in, around and out of the factory. Our recommendations went to the Board.

A couple of months later we were back at the factory watching the early runs with the new equipment. Everyone was enthusiastic about the way things were going. They had every reason to be: production hold-ups had become a thing of the past.

"*The way the Guv'nor's beaming, you'd think it was all his idea*," said the Factory Manager.

Why not pass your handling problems to us? Our Technical Representatives will call and advise you how Yale can solve your materials handling problems and help reduce production costs.

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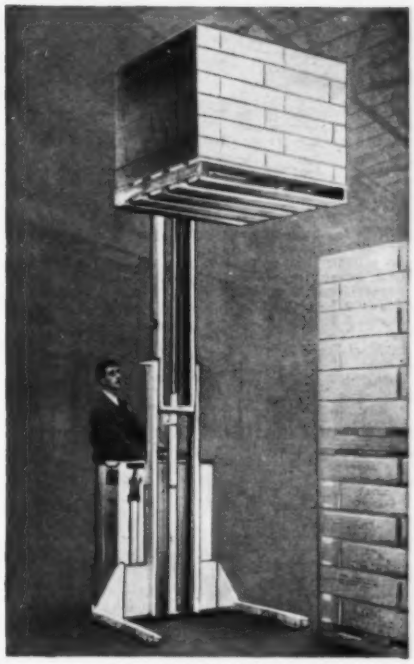
- ★ Fast handling speeds.
- ★ Straddle fork lift models available in 2,000 and 3,000 lbs. capacities, with standard lifts to 147". Pallet and low lift platform models up to 2 tons capacity.
- ★ Available with either lead-acid or nickel-alkaline batteries.
- ★ Low initial cost, low running cost, economical up-keep, long life.



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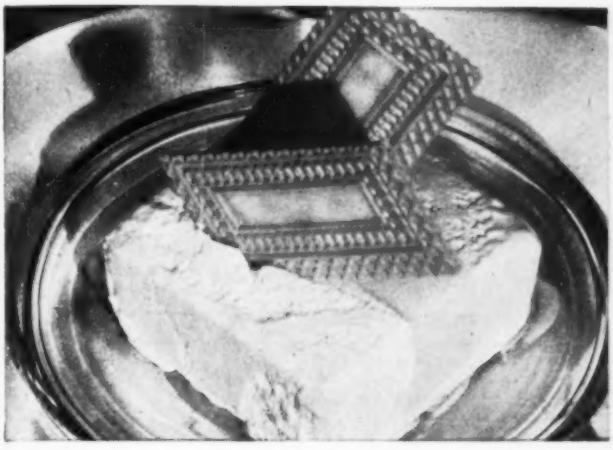

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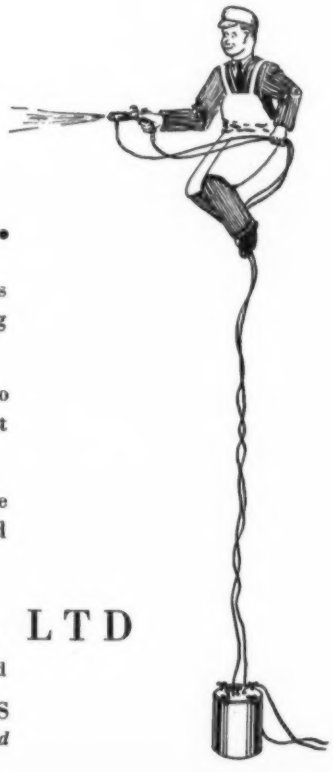

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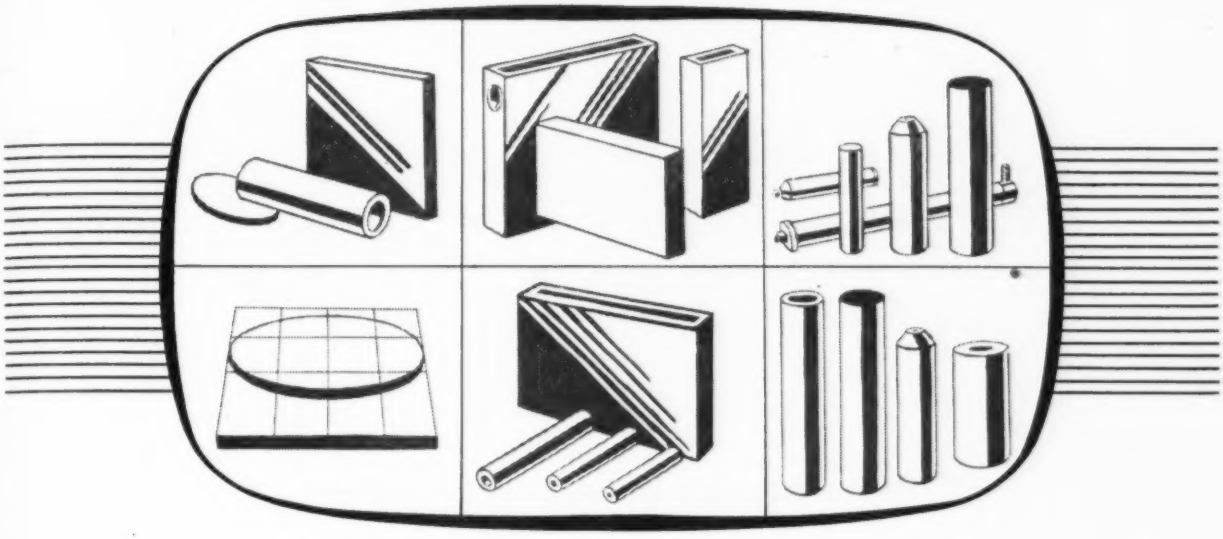

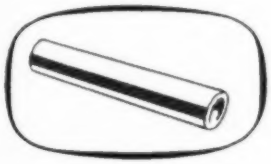

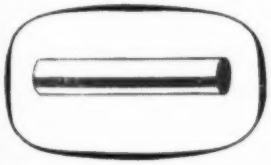

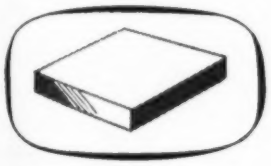

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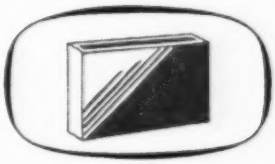

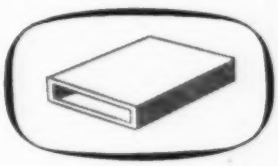

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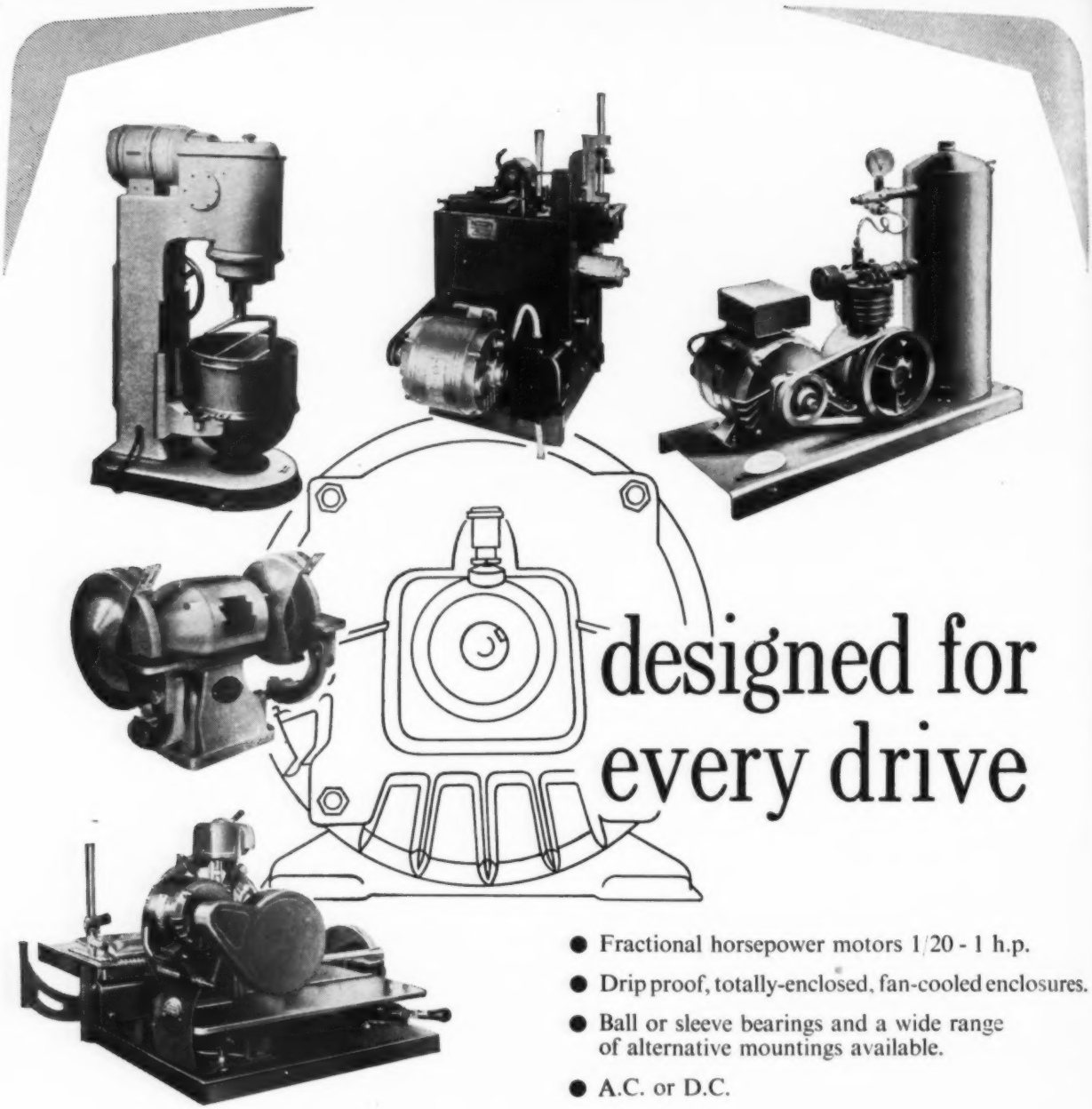

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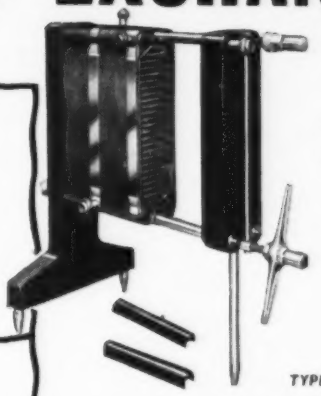

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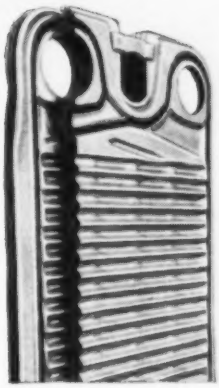

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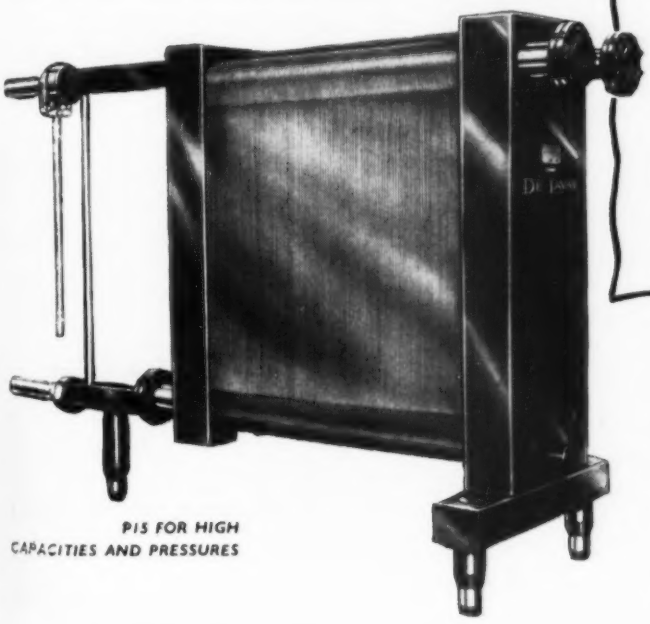

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Collapsible metal tubes for foods

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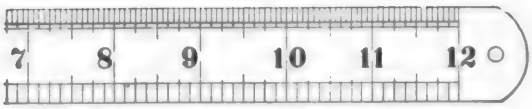
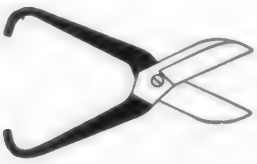


We have always specialised in "tailor made" metalwork to meet the specific needs of the Food Industry.



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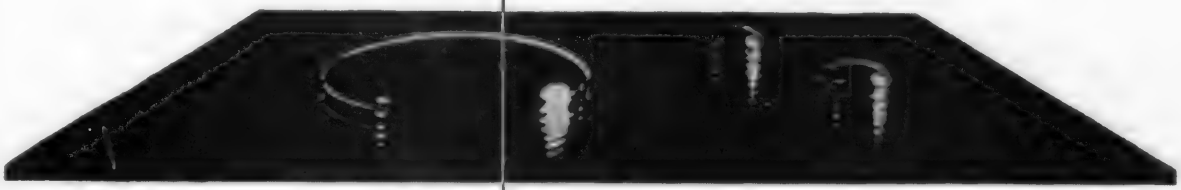

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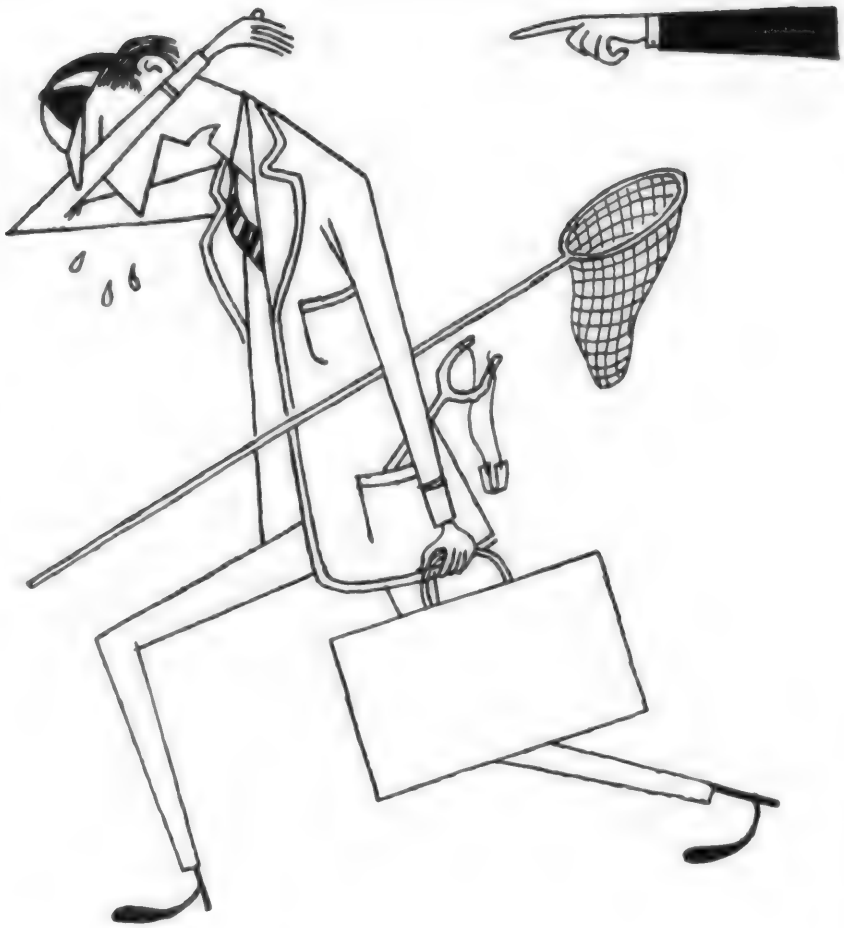

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"Dash it all, m'boy, if these people had told *me* about automatic air venting I would at least have given it a trial; and very quickly, too".

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"RADIATION" WORM REDUCTION GEARS

... FRACTIONAL UP TO 450 H.P.

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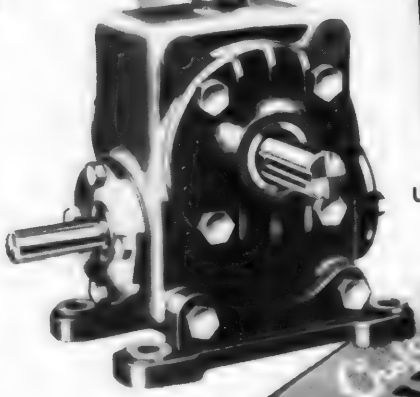

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STANDARD "R" TYPE GEARS
FROM STOCK up to 65 H.P.
Ratios 5-1 up to 60-1
Larger Units up to 450 H.P. early delivery.

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MALT EXTRACT

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An ever-increasing application to food industries

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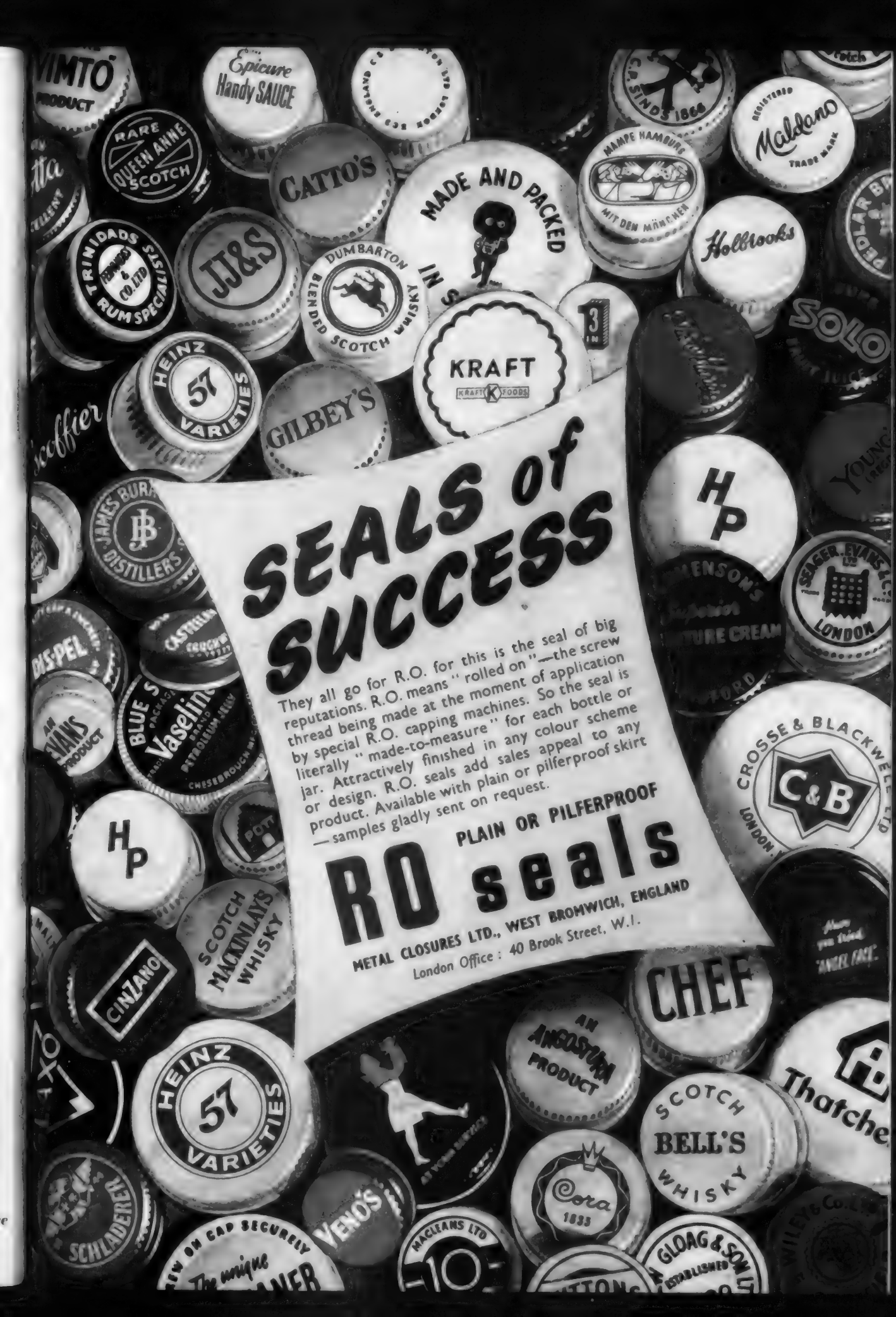
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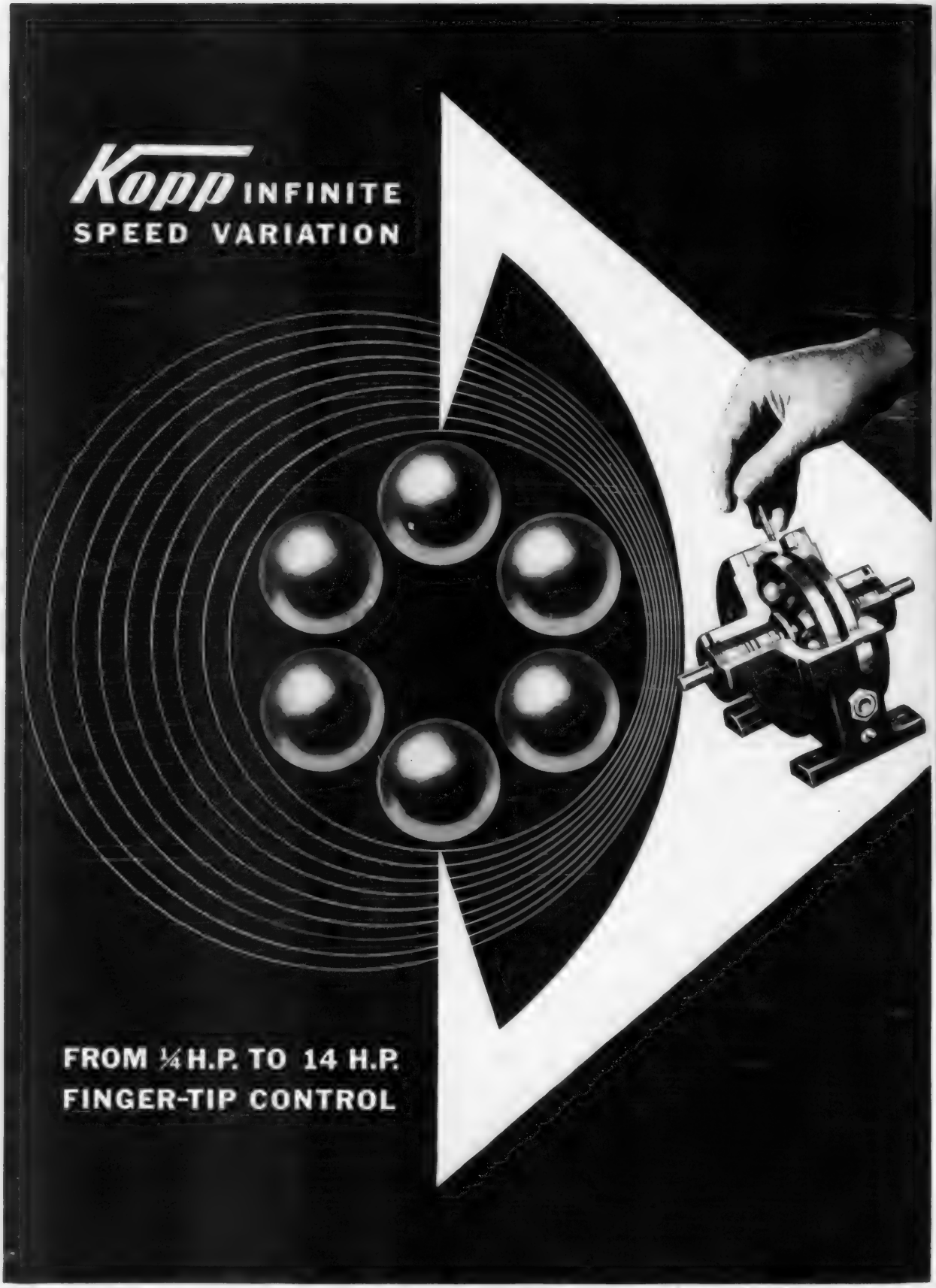

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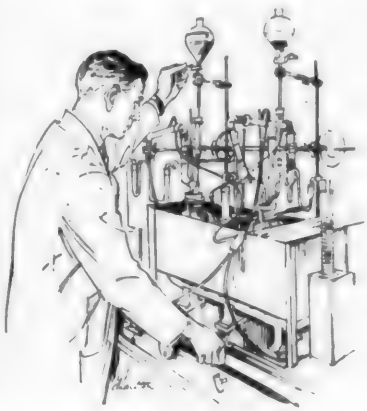

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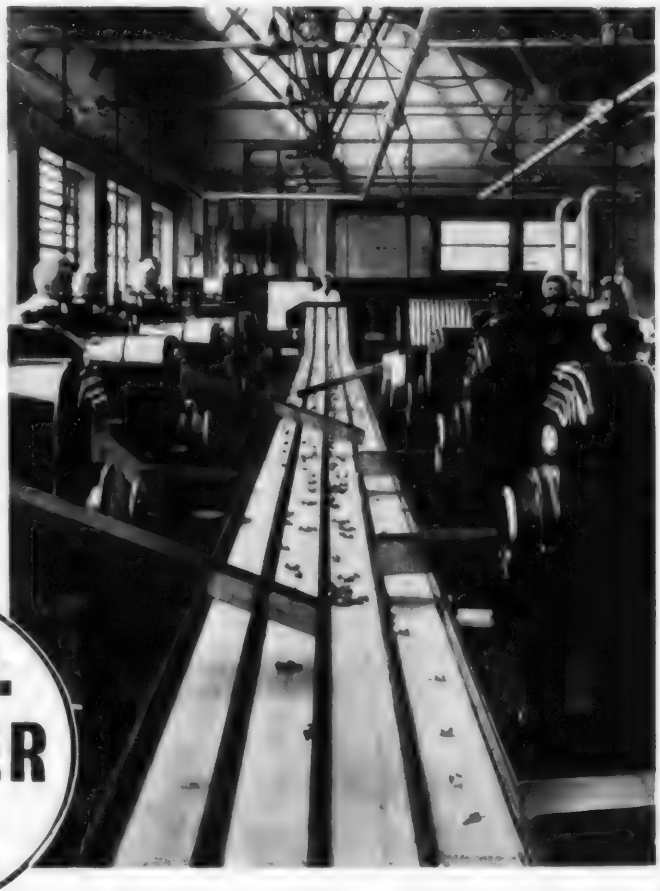

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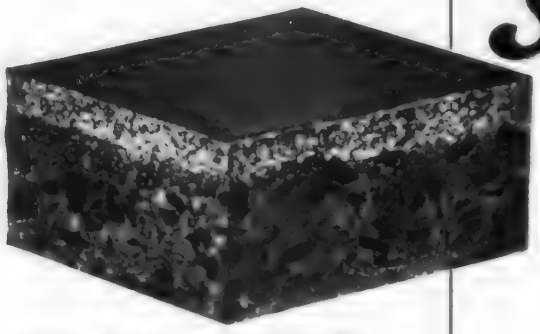

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WASHINGTON · CO. DURHAM · ENGLAND

Warwick

Britain's First Choice in HYGIENIC ALUMINIUM EQUIPMENT

STACKING CONTAINER

TBH. 26165

A 2,000 cu. in. heavy gauge strong alloy one-piece pressed tray, beaded top edge, fitted with die cast stacking corners and drop down handles.

WARWICK PRODUCTION COMPANY LTD

IN ASSOCIATION WITH **ALMIN LIMITED** FARNHAM ROYAL BUCKS

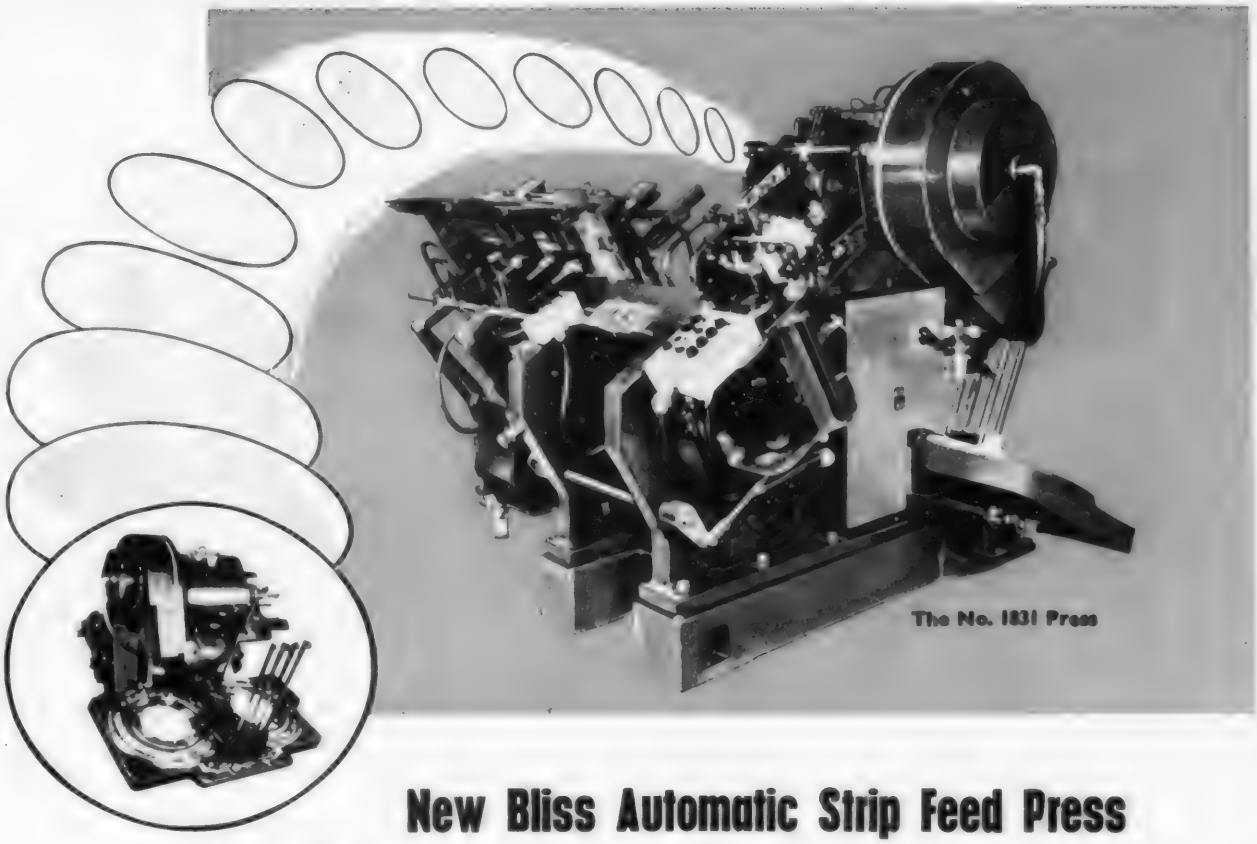
BIRMINGHAM ROAD, WARWICK · Telephone WARWICK 693-696

Life is smooth and life is even—but monotonous? Never! Not with responsibilities like mine. I happen to be the power behind an important production process. No, I'm not bored; that sound you hear is the hum of quiet contentment . . . a murmur of satisfaction at a job well done.

I'm a Busy Little Bee from G.E.C.

G.E.C. Fractionals

THE GENERAL ELECTRIC COMPANY LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2



New Bliss Automatic Strip Feed Press will deliver more than 300 strokes per minute!

From the ground up, it's been engineered to slash maintenance needs and boost production speeds.

You wanted speed in your strip feed presses—reliable speed! And here it is: to 300 strokes per minute (or more, depending upon can size), more than 18,000 strokes per hour all day long—without time-wasting stoppages for readjustment and repair.

One of the major features of the new Bliss press is its precision counter-balanced crankshaft and feed bar crank which holds vibration to an almost irreducible minimum and thereby permits smooth, quiet operation at high speed.

Other features: combination disc friction clutch and brake—permits instant starting; feed bar is driven by crank instead of lever—and has adjustable fingers; a bigger bolster plate; no idle strokes between strips, if desired; slide stops instantly at top of stroke.

You'll want to know more about these developments. For complete details, write, wire or phone

E. W. BLISS (ENGLAND) LTD.

CITY ROAD • DERBY

Telephone: DERBY 45801

London Office:
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Telephone: ABBEY 3651

B/33

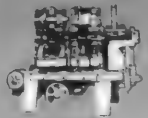
BLISS on your machine is more than a name . . . *it's a guarantee!*

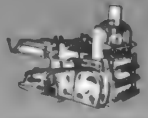
BLISS CAN AND CONTAINER MAKING MACHINERY

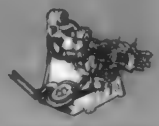
SLITTERS

BODYMAKERS

FLANGERS


SEAMERS


SCROLL SHEARS


STRIP FEED PRESSES

For long periods of trouble-free service between overhauls

COMMER

'SUPERPOISE' 5 TONNER

SALIENT FEATURES

- ★ Choice of three o.h.v. engines : 85 b.h.p. petrol (chrome bores an optional extra), 83 b.h.p. diesel, or 108 b.h.p. diesel.
- ★ Robust four-speed synchromesh gearbox.
- ★ Fully-floating spiral bevel rear axle.
- ★ Servo-assisted hydraulic brakes, two-leading-shoe type.
- ★ Distortion of cab prevented by patented 'Diaflex' mounting.

A PRODUCT OF THE ROOTES GROUP

COMMER CARS LTD. LUTON EXPORT DIVISION: ROOTES LTD. DEVONSHIRE HOUSE PICCADILLY LONDON W.1

A Guide to the English Character . . .

Resistance to Climate . . .

No doubt it is the Englishman's predilection for cross-ventilation (called 'draughts' by foreigners) that renders him, and her, so resistant to the aquatic life of the native summer. It may be his belief in the virtues of the Arctic blast as an adjunct to health that lends to his cough the virile resonant note of the true open-air man. Engineers, though, are usually more concerned with corrosive attacks than coughing attacks. Fortunately, their remedy is close to hand: they rely upon Semtex. Though the value of Semtex cements as a cough-cure remains to be proved, their efficacy in corrosion-resistance work is undoubted. Works Managers who wish to keep their industrial plant in the pink of physical condition should write to one of the addresses below for the advice and illustrated brochure of the Semtex Industrial Division.

SEMTEX

INDUSTRIAL DIVISION

Headquarters and Southern Area Office:
Semtex House, The Broadway, Welsh Harp, London, NW9 Tel: Hendon 6543

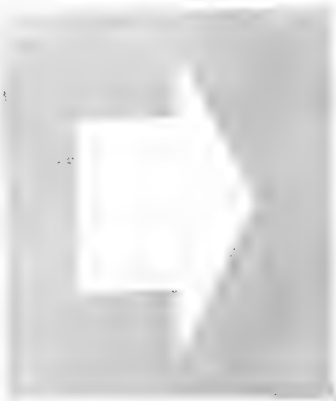
Northern Area Office: **50 Blackfriars Road, Salford, 3 Tel: Deansgate 2128**

SPECIALISTS in INDUSTRIAL ANTI-CORROSION TREATMENTS · FLOORING & DECKING CONTRACTORS

A Dunlop Company

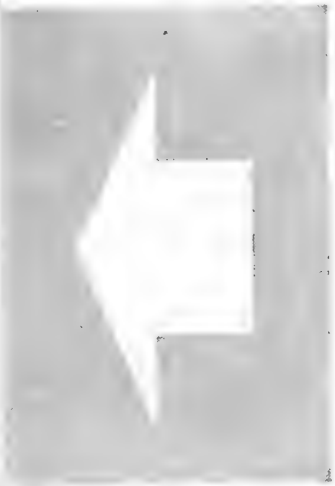
I.C.I. DENDRITIC SALT

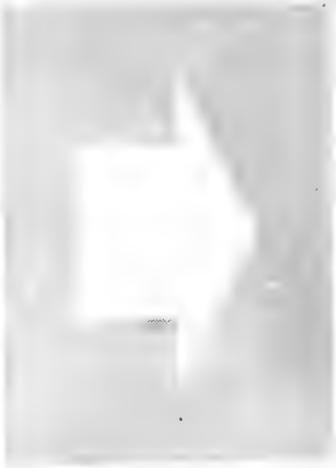
–a NEW fine grade for foodstuffs



I.C.I. Dendritic Salt is a fine vacuum salt with a new crystal shape. It is soft and floury, with the following distinctive qualities—which are of special advantage in many applications in the food and dairy industries :

- Outstanding non-caking properties
- High purity—99.6% sodium chloride
- Blends well with other finely-divided materials
- Low bulk density—ensuring good covering power
- Rapidly soluble in water

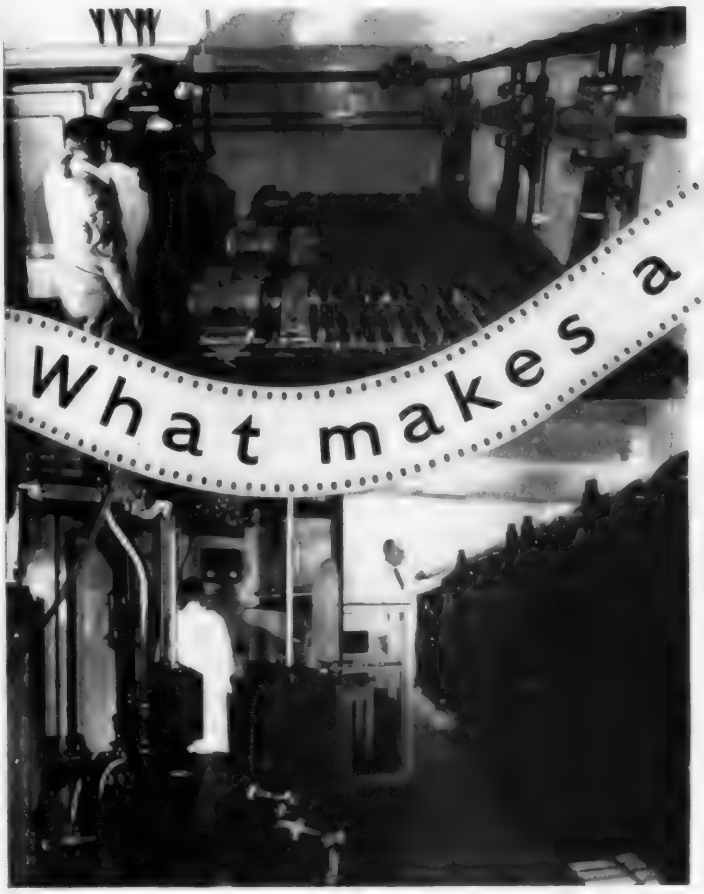




I.C.I. Dendritic Salt is of particular interest to users of Dairy or fine Crystal salt, since it not only offers technical advantages but is also cheaper.
Imperial Chemical Industries Ltd. are the sole manufacturers of Dendritic Salt, which is protected by patents in Great Britain and other countries throughout the world.

IMPERIAL CHEMICAL INDUSTRIES LTD.
LONDON, S.W.1

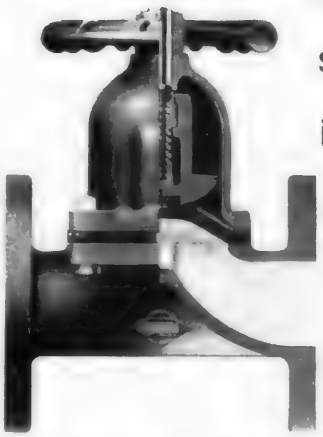
ICI



What makes a good Film?

Associated British Pathe Ltd. in whose laboratories these pictures were taken could answer that one better than we.

Undoubtedly they agree that sure control of the fluids involved in the processing is essential for the various operations—as is confirmed by the many seen and unseen Saunders Valves in this installation.



SAUNDERS DIAPHRAGM VALVES

The Saunders Technical Handbook, available to all Food Manufacturers, explains the many features and methods of operation and, in the list of nearly 300 applications, recommends the most suitable specifications for controlling the fluids encountered in food production.

SAUNDERS VALVE COMPANY LIMITED

DIAPHRAGM VALVE DIVISION

CWMBRAN NEWPORT MONMOUTHSHIRE

STOKELESS FUEL

Your gas account shows exactly how much you spend on fuel. There are no extra hands to pay because gas needs no special equipment for handling or storage. Gas burners give you years of life, with little servicing or replacement. That means uninterrupted, therefore greater, production. These are points to remember when assessing the true cost of your fuel. Gas is stored, examined and tested for you and delivered direct to the point of use. It burns clear and clean, is infinitely adaptable and easy to control. For your heat problem gas may well be the answer.

'Not knowing' can be costly.

YOU can call upon the resources of the Gas Industry to solve your fuel problem by consulting your Area Gas Board. The Boards' Industrial Gas Engineers are ready to give you free advice. They, in turn, can call upon the resources of the whole Gas Industry through the Gas Council's Industrial Gas Development Committee. Get your secretary to fill in these details (or pin this advertisement to your letter heading) **and send to your Area Gas Board or to the Gas Council, 1 Grosvenor Place, London, S.W.1**

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ADDRESS .....

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WE NEED HEAT FOR..... 2/3

*The Gas Industry makes the **fullest** use of the nation's coal.*

GC.GBA

Have you got your fats right?

WHETHER you manufacture ice cream or meat pastes, sweets or cakes, biscuits or synthetic creams, you need a specialised fat—one that's prepared and blended with your particular production needs in mind.

As the largest manufacturers of trade margarines and shortenings in the British Isles, we feel we can justly claim to have all the fats at our finger-tips. Our experience in the refining and blending of fats for the food industry goes back a long way and today our plant at Bromborough, Cheshire, turns out every possible variety of fat—ranging from salted and unsalted margarines to hydrogenated and emulsifier shortenings.

If you're looking for a better fat, you'll find that CBC have one that's exactly right for you!

Just drop us a line—you'll find our technical advisers ready to help you with any information and advice you may require.

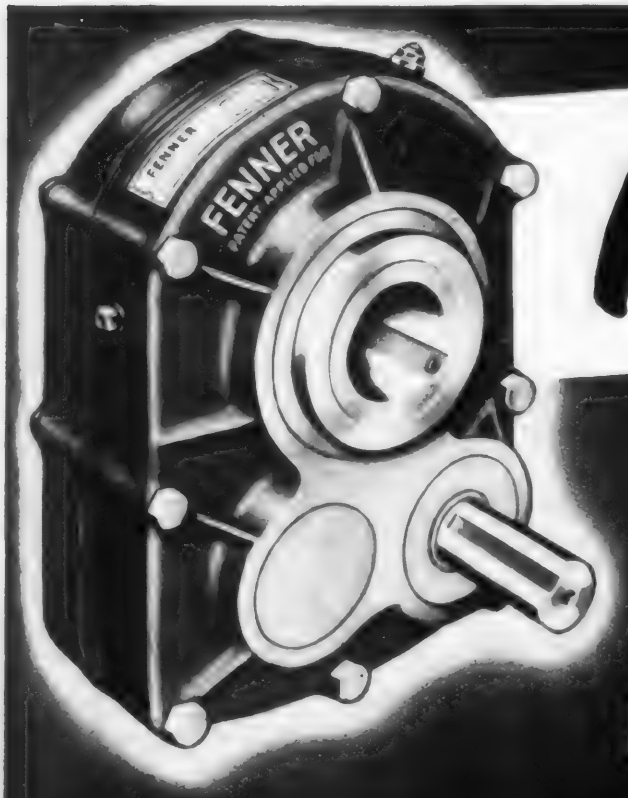
Check your fats with CBC

CRAIGMILLAR AND BRITISH CREAMERIES LIMITED

SUSSEX HOUSE, QUEEN STREET, LONDON, E.C.4 Telephone: CITy 6783

CBC

CCT 28-9-10-D



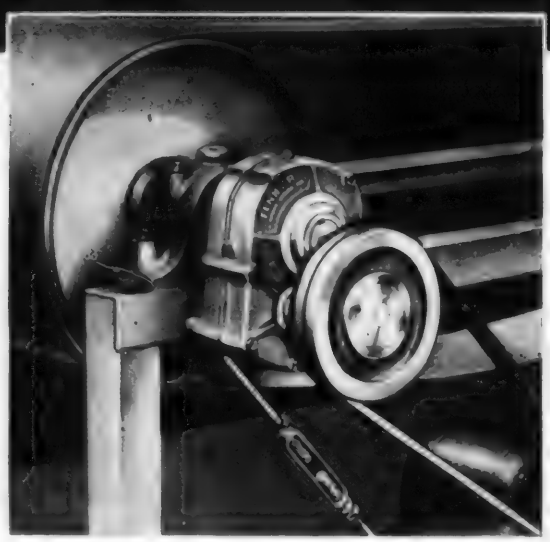
NEW!

TORQUE-ARM SHAFT MOUNTED SPEED REDUCER

SAVES TIME AND MONEY

Designed to mount directly on to the driven shaft of the machine. A Torque-Arm anchors the Reducer and NO BASEPLATE, FLEXIBLE COUPLINGS OR MOTOR SLIDE RAILS ARE REQUIRED. Lining up of the conventional reducer is eliminated. Just slip the unit over the shaft, key it in position, anchor, and it is ready to run. Available in 4 sizes up to 12 H.P. from STOCK, at Fenner Branches and Distributors.

J. H. FENNER & CO. LTD. · HULL · ENGLAND



Write for illustrated Catalogues giving all the facts.

FENNER

OF HULL

FIRST WITH TORQUE-ARM SHAFT MOUNTED *SPEED REDUCERS*

For light, bright, lasting equipment to meet the highest standards of hygiene—

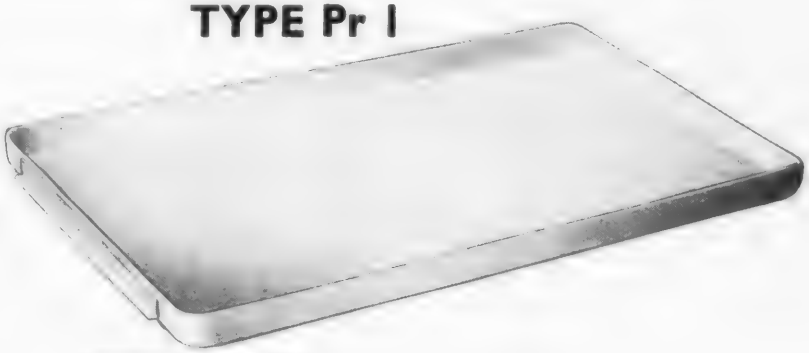
PHŒNIX is the answer

Phœnix Trays have been supplied to answer many specific requirements in the food and confectionery industries. In every instance their supreme fitness for the job has been proven in lighter work, easier cleaning, rigid interstacking and sturdy service.

ALUMINIUM PRESSED TRAYS

These trays have the great strength of high quality aluminium, plus the light weight that goes with it. Used widely for Biscuit and Cake processing, they have many other applications in manufacture when made to the dimensions required, with special features incorporated to customers' wishes. They can be made to interstack or not, and are the economical answer in hygiene, long service and easy cleaning.

TYPE Pr I



Send for illustrated catalogue of Trays stating purpose for which required to Dept. F.M.

TYPE P4

A NEW *DIAMOND MESH* PERFORATED COOLING TRAY

Precision manufactured in highest grade aluminium with perforated base integral with sides and ends. Reinforced corner angles are designed for accurate interstacking, leaving lifting space between stacked trays for easy handling. Used for many purposes where cooling and hygiene are of paramount importance, e.g., Restaurant crockery trays; Processing with sugar confectionery; Nut sorting and a wide variety of other uses.

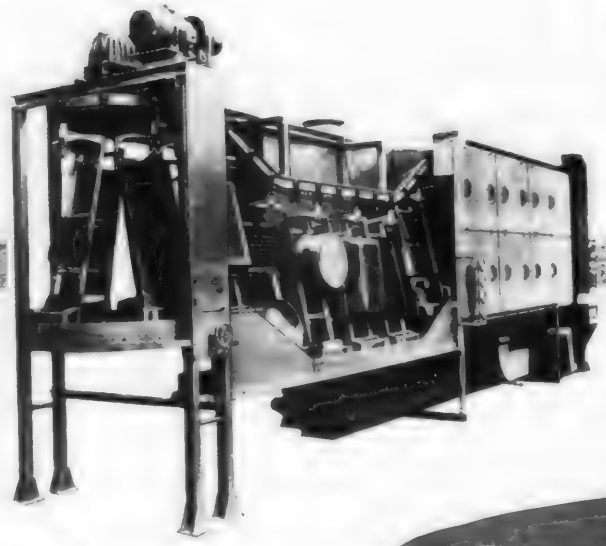
HESTON EQUIPMENT COMPANY LTD

1 BUCKINGHAM PALACE MANSIONS · LONDON · S.W.1

Works: Heston Airport, Middlesex. ***Telephone: SLOane 9934-5-6***

MEMBER OF THE HESTON GROUP OF COMPANIES

WASH

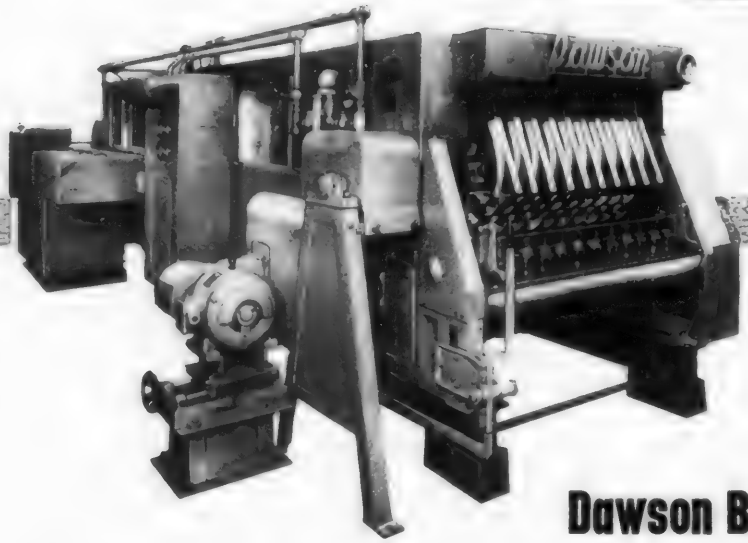


A monorail machine for washing rinsing and drying varied Food Utensils.

Small machine for washing and rinsing Bakers' Trays.

ESTABLISHED 1864

The Quick, Economical
Dawson
Hygienic way

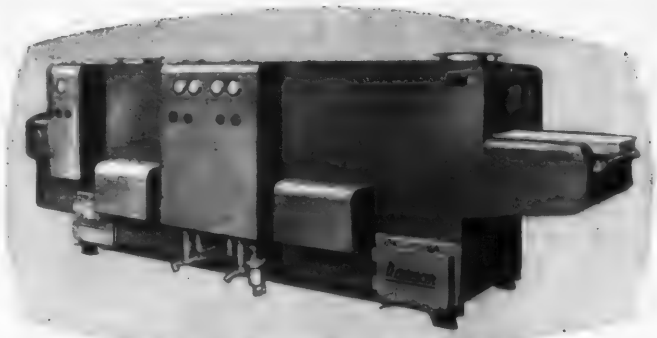


A Bottle and Jam Jar washing, de-labelling, rinsing and sterilising machine.

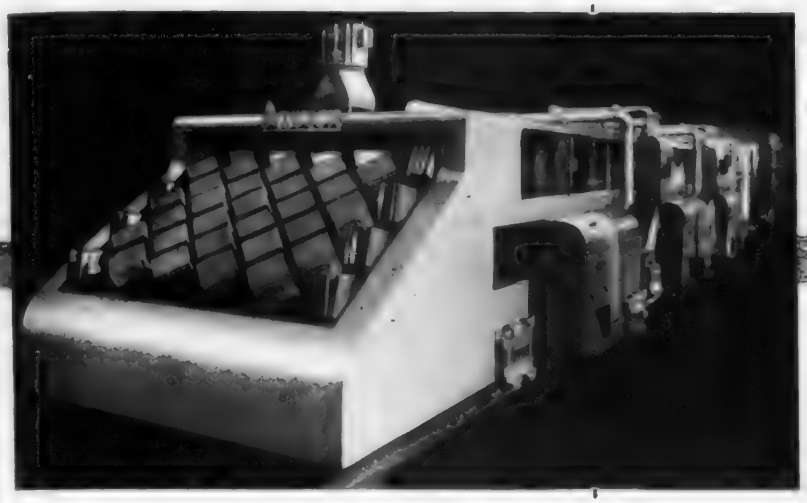
Tel.: Cleckheaton 1080 (5 lines)

Dawson Bros. Ltd., Gomersal, Nr. LEEDS

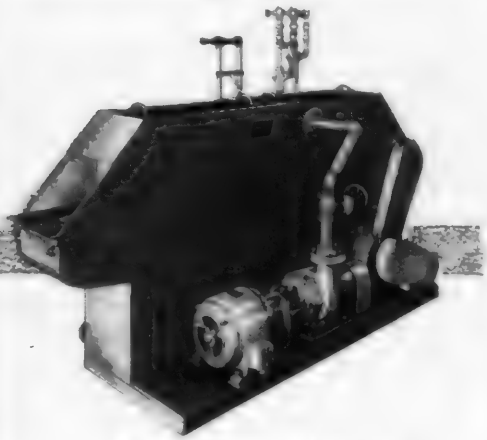
CLEAN



Washes, rinses and sterilises 200—300 trays per hour.



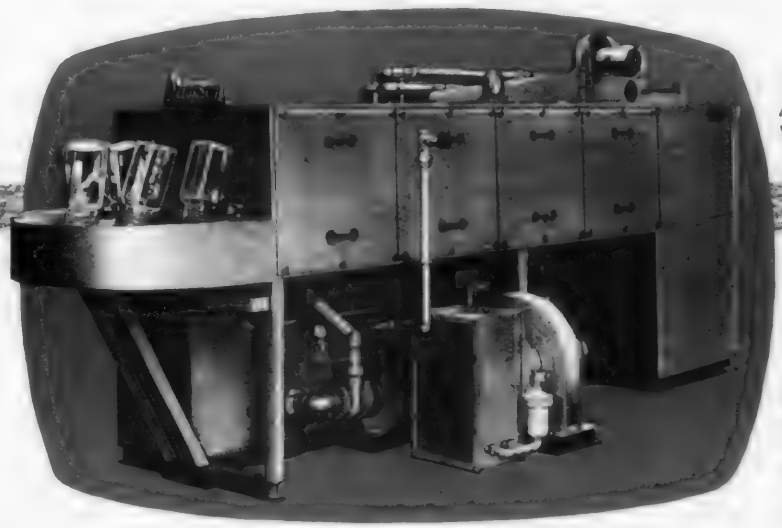
For washing and de-labelling and drying biscuit tins and lids. Capacity 2,000 per hour.



Small Can Washer and Rinser for 30—60 cans per minute.

Make sure that every type of container and utensil used in the manufacture of Food Products is clean, sterile and satisfies Health Regulations.

Dawson washing plant is used extensively today by manufacturers of all types of Food products. Whatever the size or shape of tin, can, tray, jar, bottle, container, mould or food utensil Dawson machines will wash and dry these articles in the minimum time for the lowest cost. Let us know what you have to clean and we shall be pleased to advise you.



A Rotary Jar and Tin washing and drying machine. Capacity 150 per hour.

London Office:
406 Roding Lane South,
Woodford Green, Essex.
Tel.: Wanstead 7777 (4 lines)

Some of the 7,000 COLT *users*

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Batchelors Peas (Southall) Ltd.
Birds Eye Foods (Gt. Yarmouth) Ltd.
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. . . one of over 7,000 major industrial organisations with ventilation planned by COLT

Unnecessary fatigue and loss of production were caused by radiant heat and excessively high air temperatures in the Wafer Department at W. & R. Jacob & Co. (L'POOL) Ltd.

Colt were consulted and a detailed ventilation survey proved that although more than sufficient extract ventilation already existed, this was unable to function properly owing to inadequate inlet air supplies.

Five Colt Inflow Units were recommended to supply the inlet air needed whilst at the same time off-setting the discomfort caused by radiant heat by means of the positive air movement created by these ventilators.

This is the most recent of nine separate Colt Ventilation contracts so far completed for this company, all of which have been highly satisfactory.

FREE MANUAL, *with full specifications of the wide range of Colt Ventilators is available on request from Dept. S.38/262.*

COLT *THE SPECIALISTS IN PLANNED NATURAL* **VENTILATION**

COLT VENTILATION LTD · SURBITON · SURREY · TELEPHONE: ELMBRIDGE 6511-5

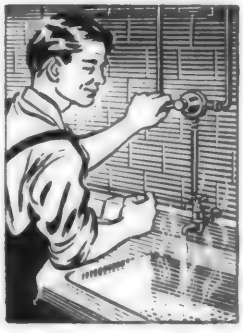
Also at Birmingham, Bradford, Bridgend (Glam.), Bristol, Dublin, Edinburgh, Liverpool, London, Manchester, Newcastle-upon-Tyne, Sheffield and Warwick.

PERMUTIT
provides Demineralised Water
for Food Manufacture
For critical needs in food preparation, distilled quality water is essential, but distilled water is expensive: its production uses heat or steam.
The modern substitute is demineralised water, produced at only a small fraction of the cost of distillation by "Deminrolit" Ion Exchange.
"Deminrolit" plants are made in all sizes from Portable units to larger fixed installations, similar to the one shown here. If you would like to have them, we will gladly send full technical details.

The **PERMUTIT Company Ltd.**, Dept. W.L.210, Permutit House, Gunnersbury Avenue, London, W.4. CHiswick 6431

INSTANT HOT WATER FROM STEAM

with automatic temperature control



Hot water, plenty of hot water from tepid to very hot, instantly, cheaply—that's what you want and that's what you get with a Leonard Thermostatic Steam Water Heater. Hot water is made only when it is wanted and where it is wanted. There are no heat losses through storage or radiation. No expensive piping or equipment required. The Leonard Thermostatic Steam Water Heater is easily and quickly installed—no upsets, no delays. It is widely used in Laundries, Tanneries, Textile Mills, Breweries, Dairies, and other Food Industries, Tinplate Works, etc.

Write for leaflet No. 9/S

WALKER, CROSWELLER AND CO. LTD. CHELTENHAM

Leonard

(PATENTED)

Initials that mean so much in glass

Always

USE GOOD BOTTLES

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UNITED GLASS BOTTLE MANUFACTURERS LTD

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Brand

ESTABLISHED 1841

PURE VEGETABLE CHOCOLATE COLOUR

EXTRA CONCENTRATED

This colour is guaranteed to be entirely natural and free from any artificial or aniline dye. This is the strongest, richest and most economical preparation of its kind, and is very stable under high temperature.

Recommended for: **FONDANT, ICING, SWISS ROLLS, SPONGES, Etc.**

A Natural Product in a form which can be easily and conveniently and economically used by our customers.

We are specialists in this field and for full details of our Range of Natural Colours, write:

WHITE, TOMKINS & COURAGE, LTD

NORTH ALBERT WORKS, REIGATE

Telephone: Reigate 2242/3 *Telegrams:* ESSWHITE, REIGATE

food for thought

HORLICKS SELECT REDLER PLANT FOR AUSTRALIA

"For a number of years REDLER mechanical handling plant has given complete satisfaction at the Horlicks' British factory, and when the new Australian factory was designed Redler Conveyors Limited were again entrusted with the handling of this famous food. This choice of REDLER plant for the two Horlicks factories thousands of miles apart is testimony to the reliability and efficiency of REDLER equipment."

REDLER conveyor-elevators can be used to handle any material in powder, granular or small lumpy form in practically any direction, horizontally, vertically, inclined or round bends. The plant is totally enclosed, thus reducing the risk of explosion and eliminating the nuisance of dust or vermin. As the material "flows" in a solid column, there is practically no breakage, even of the most fragile substances. The machines are self-feeding and choking cannot take place, as once the casing is full no more material can enter.

REDLER

REGISTERED TRADE MARK

EN MASSE
CONVEYORS & ELEVATORS

WRITE FOR REDLER CATALOGUE No. 152

REDLER CONVEYORS LIMITED DUDBRIDGE WORKS STROUD GLOS.

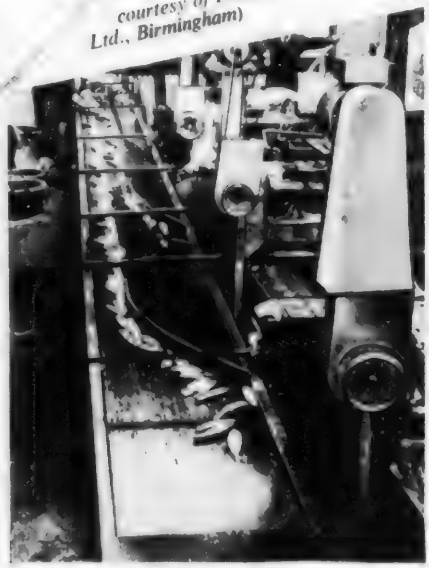
TELEPHONE STROUD 761 (3 LINES) TELEGRAMS REDLER STROUD LONDON OFFICE 47 VICTORIA STREET S.W.1 TELEPHONE ABBEY 3761

SCANDURA P.V.C. belting

helps the food industry

Cake packing on a 'Motaveyor' (by courtesy of Knightsbridge Cake Limited, Manchester)

Fruit bottling on a 'Motaveyor' conveyor (by courtesy of J. Mawdsley Ltd., Wigan)



Scandura conveyor in a fish canning factory (by courtesy of Fisher & Ludlow Ltd., Birmingham)

As the pioneers of P.V.C. covered conveyor belting British Belting & Asbestos have supplied their SCANDURA belting for many varied applications. Due to its resistance to contamination and its hygienic qualities SCANDURA has become the obvious choice for food conveyor belting. Its lasting qualities had already been proved in food factories two years before its first introduction in Britain's coal mines in 1948, and its fire resistant properties have brought a hitherto unknown safety margin where conveyor fire hazards originally existed. SCANDURA is available now, in varying widths and thicknesses to suit all applications.

SCANDURA P.V.C. BELTING IS MANUFACTURED BY **BBA**

BRITISH BELTING & ASBESTOS LIMITED · CLECKHEATON · YORKSHIRE

FASTER MACHINE SPEEDS

yes! with faster setting adhesives

National

YES!

We would like your technical representative to call and give us fuller details of how National quick-setting adhesives can speed our production

All enquiries to Department "B"

NATIONAL ADHESIVES LTD., SLOUGH, BUCKS

Telephone : SLOUGH 23344

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Liquid process control by **MEASUREMENT**

1½" S 7. stainless steel meter with screw on flanges and 12" vertical index.

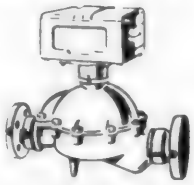
When you require to measure bulk or batch quantities of edible liquids, oils, spirits and solvents, hot or cold water, we can supply meters with summating, resettable, electrical presettable, direct reading or pointer type index attachments (as illustrated) and control equipment.

MEASUREMENT

INDUSTRIAL **LIQUID** *METERS*

(A COMPANY OF THE PARKINSON & COWAN GROUP)

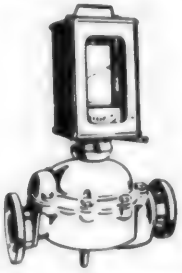
MEASUREMENT LTD. HYDRAULICS DIVISION
119 Union Street, Oldham, Lancs. Telephone: Main 6432.
LONDON: TERMINAL HOUSE, Grosvenor Gardens, London, S.W.1.
Telephone: SLOane: 0111.



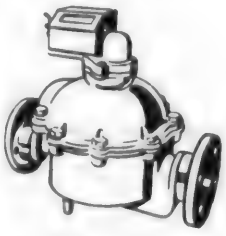
BOX TYPE COUNTER
Re-settable batch-dispensing counter with 7-digit cumulative total register.

6" VERTICAL RE-SETTING INDEX
Can also be used to pre-set a determined quantity, with electric trip to operate solenoids pumps, warnings, etc.

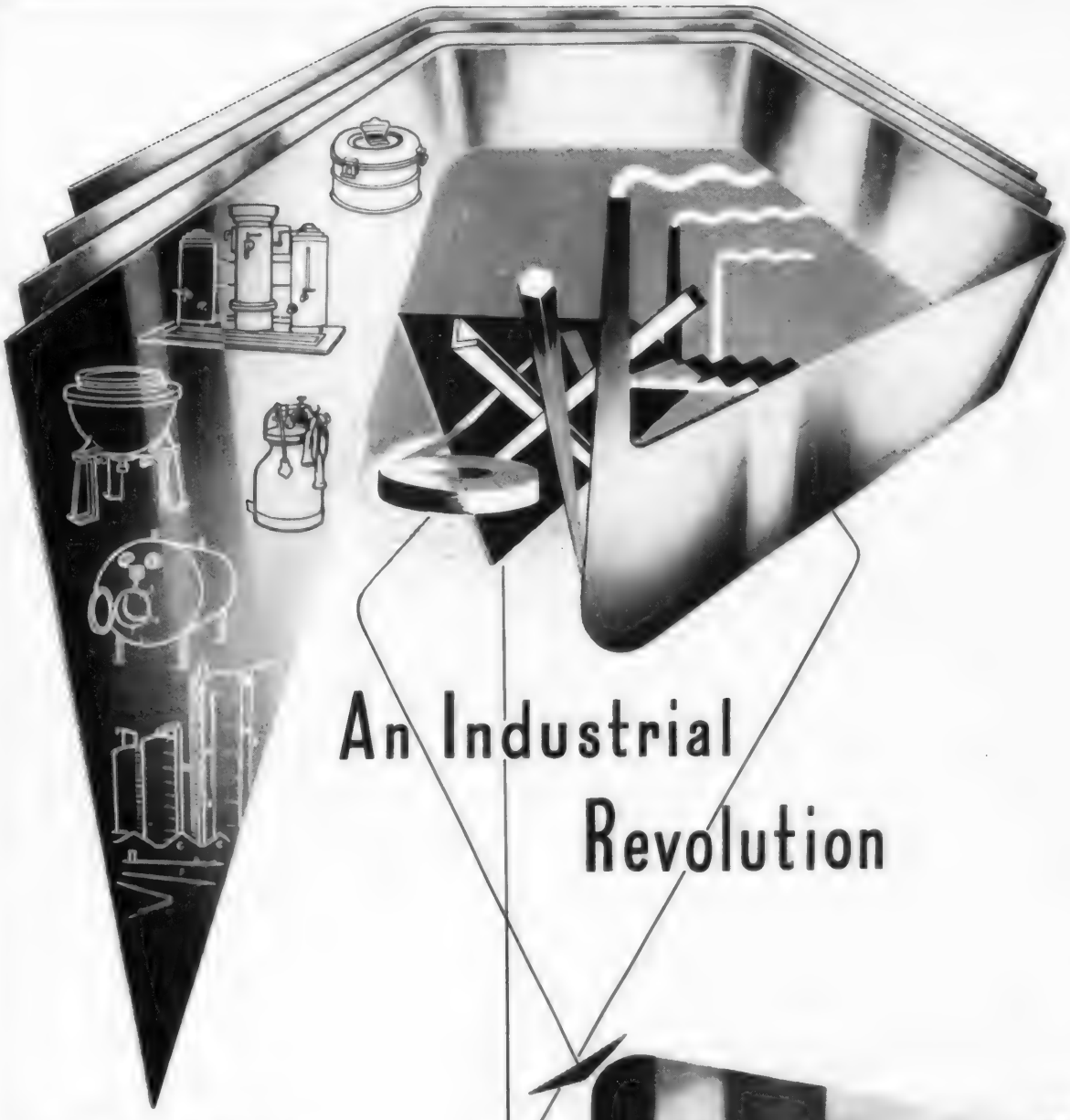
ZEROSET INDEX
Simple turning motion re-sets indicator to zero.



MECHANICAL RECORDER
Gives a graphic record on 5" x 12" chart; suitable for 4 hour, 8 hour, 1 day, 7 day periods



PREDEX CONTROLLER
Automatic means for continuous dispensing of fixed quantities of liquids.



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in all forms and finishes

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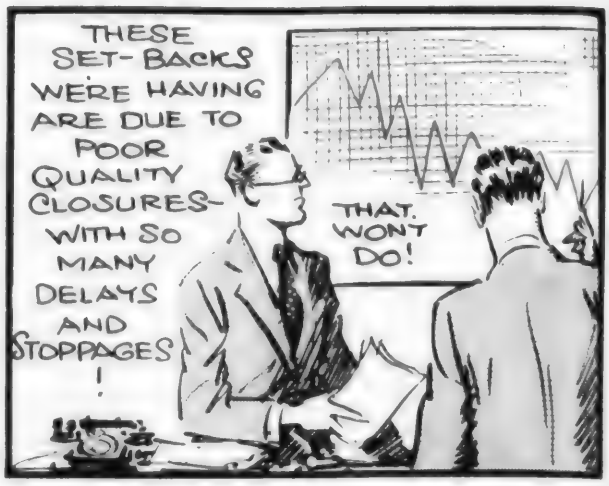
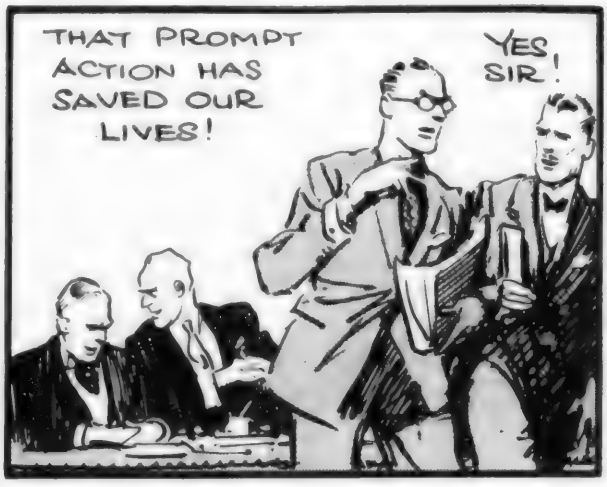
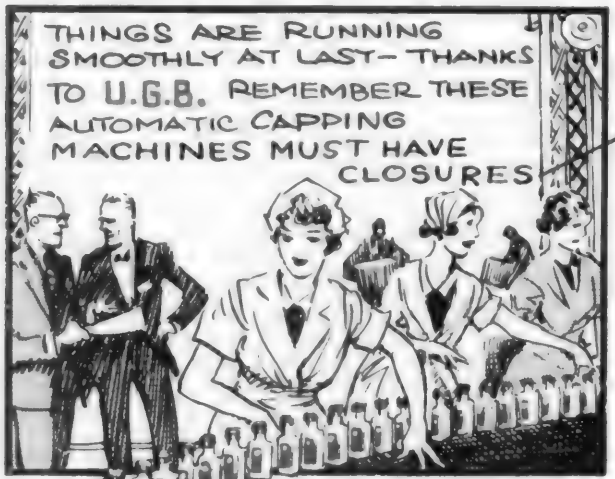
P&V







OF CONSISTENT ACCURACY

U G B

CLOSURE DIVISION

UNITED GLASS BOTTLE MANUFACTURERS LTD

8 LEICESTER STREET, LONDON, W.C.2

Telephone: GERRARD 8611 (18 Lines) *Telegrams:* UNGLABOMAN, LESQUARE, LONDON

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★ Textile core covered with white smooth flexible plastic

★ Wears smooth not 'woolly'.

★ Can be cleaned in a flash.

★ Highly resistant to oils, fats, greases, acids and alkalis.

★ Odourless and tasteless.

Supplied in any number of plies up to 60".

ANOTHER RIL PRODUCT

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Non-Toxic
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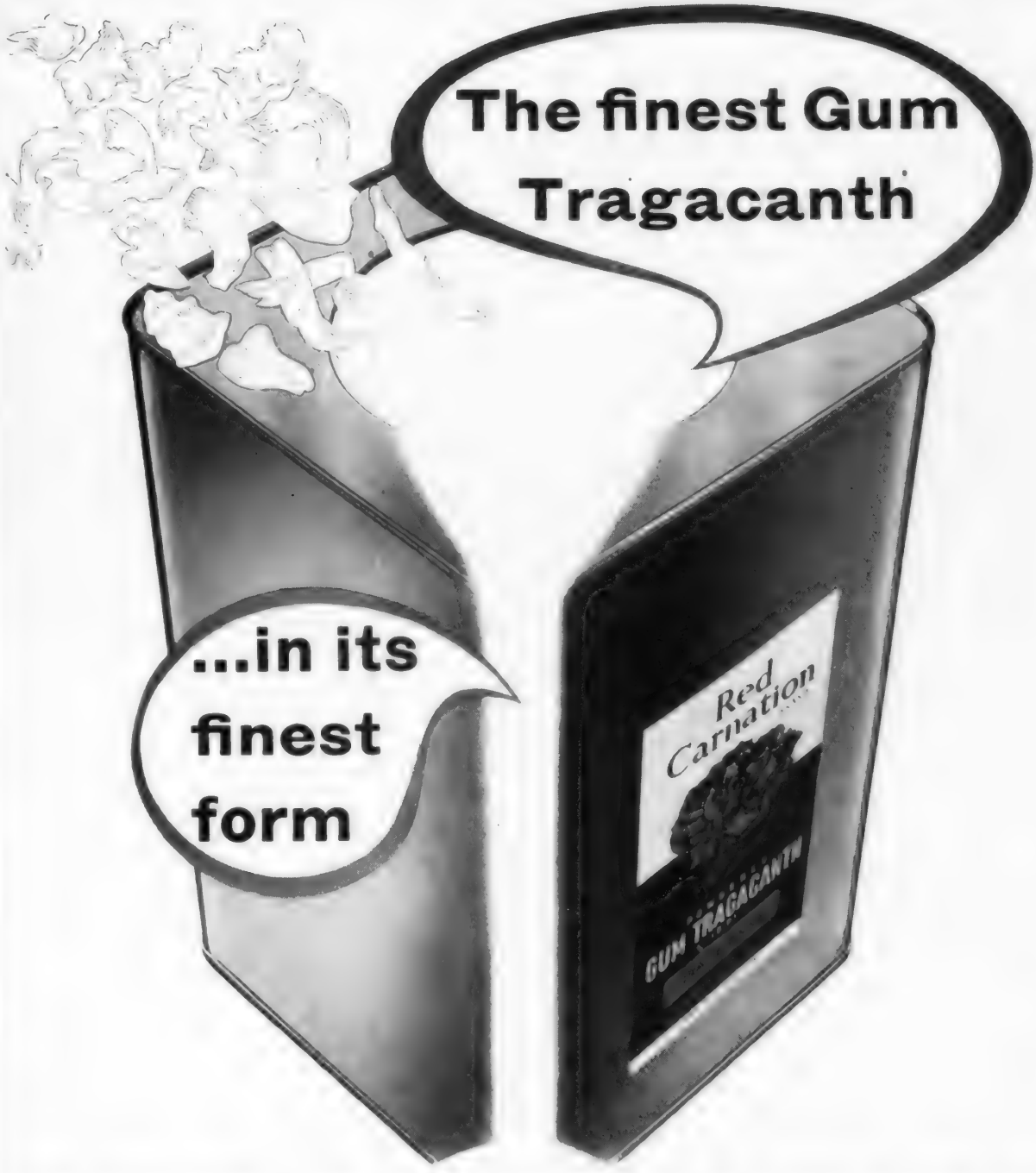
This modern battery of high speed Broadbent Centrifugals in Australia processes a large output of superior quality white sugar.

FOOD RAPIDLY AND HYGIENICALLY PROCESSED THE BROADBENT WAY

To process modern foods economically, effectively and with maximum output, insist on installing BROADBENT HIGH-SPEED CENTRIFUGALS. The extensive range covers numerous applications and the prepared food retains its original flavour and purity as suitable corrosion resisting materials are used.

THOMAS BROADBENT & SONS LIMITED

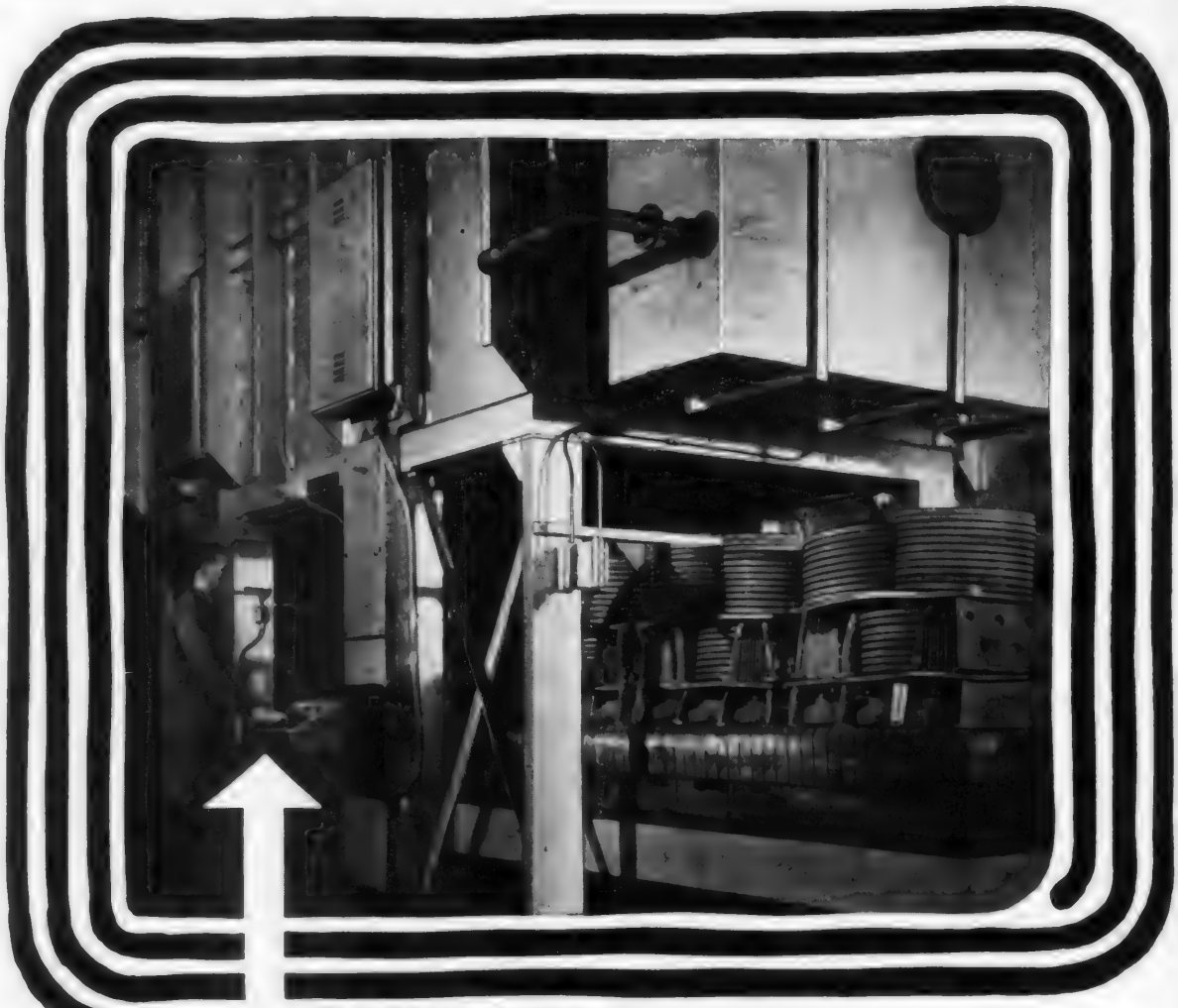


RED CARNATION

Powdered Gum Tragacanth BRAND

STABILIZED as regards viscosity, colour and fineness of powder. GROUND by a special process to ensure controlled tenuity. TESTED scientifically at every stage of processing. GRADED to a series of predetermined standards. PACKED in airtight tins to preserve freshness. Whichever grade you order, and whenever you re-order, you know you will receive powdered Gum Tragacanth of exactly the same quality and characteristics.

KIMPTON BROS. LTD., (*Established 1882*), 110 FENCHURCH ST., LONDON, E.C.3 Telephone: ROYAL 5544 (5 lines)



Load charge!

The finger on the button, a slight movement — and into the furnace go five or more tons of castings. Like all iron castings they go in brittle, but after a cycle of heat, soak and slow cool in the controlled atmosphere, they come out malleable. Gaseous annealing in an electric furnace is quick and efficient — whereas conventional methods, involving packing in boxes, require much fuel, labour and materials. For consistent high quality in the product, for cleanliness in the works, and for low costs in the process, there is nothing like an electric annealing furnace — but it is

only one of the many aids
to higher productivity
that Electricity can bring you.

Having a hand in Productivity

In every industry or trade, electrical equipment is the key to modern production methods. There are probably more production-boosting and money-saving devices than you know of. Your Electricity Board can help you and give you sound advice.

They can also make available to you, on free loan, several films on the uses of electricity in Industry — produced by the Electrical Development Association.

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The British Electrical Development Association
2 Savoy Hill, London, W.C.2.

Electricity a Power of Good for PRODUCTIVITY

KELLIE
Continuous
BLANCHER
AND RE-WASHER

Blanching Periods { *2-20 minutes*

instantly obtained by the movement of a single lever

TYPE BB

With infinitely variable speed gear and gooseneck elevator

The design of this continuous-action blancher, re-washer and gooseneck elevator embodies many new features. Its construction combines great strength and rigidity with the simplest and gentlest action and the greatest blanching capacity per square foot of floor space. Peas, beans, beets, potatoes, etc., are blanched to perfection: Galvanised mild steel or stainless steel construction.

SPECIFICATION

Blancher: Overall length, 18 ft., Overall width, 5 ft. 10 in., Overall height, 7 ft. 9 in., Overall height of pedestals, 1 ft. 9½ in., Re-washer: Overall length, 7 ft. 6 in., Overall width, 4 ft. 6 in., Overall height, 6 ft. 3 in., Diameter of drum inside, 3 ft. 3 in., Length of drum, 5 ft., Combined length of Blancher and Re-washer, 25 ft. 6 in., Height of food hopper, 6 ft. 3 in., Height of delivery chute, 3 ft. 7½ in., Horse-power required, 5, Overall width including Gooseneck Elevator, 10 ft.

KELLIE **FOR FOOD PLANT**

ROBERT KELLIE & SON LIMITED DUNDEE SCOTLAND

Telephone: Dundee 2819 (2 lines)

Telegraphic and Cable Address: "KELLIE" DUNDEE, Code A.B.C. (5th Edn.)

FACTS ABOUT ELECTRIC MOTORS

LARGE DRIP PROOF MOTOR
75 to 350 h.p.
(according to speed)

BROOK MOTORS Ltd

Can also be supplied in Totally Enclosed fan cooled frames.
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CAGE OR SLIP RING TYPES
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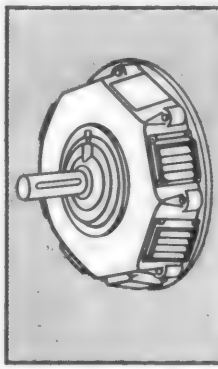
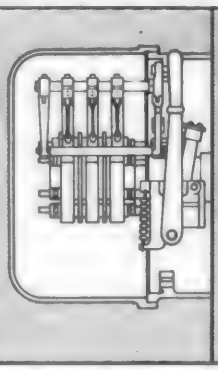
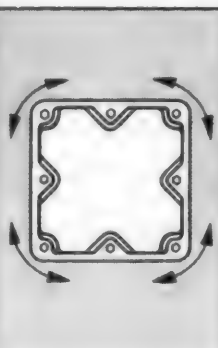
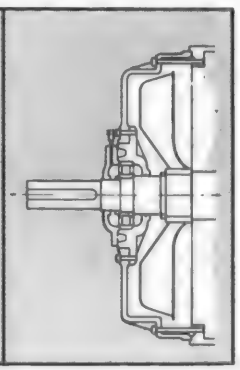
CAST-IRON STATOR FRAME INTERNALLY RIBBED

ENDSHIELDS	SLIP RINGS	ROTOR	TERMINAL BOX	BEARINGS
				
Fitted with loose louvres which can be rotated through 90° giving drip-proof protection in any mounting position.	Easily accessible. Brush lifting and short-circuiting gear with electrical interlock fitted as standard.	Mounted on cast-iron spider, keyed to shaft. Dynamically balanced to ensure vibration-free running.	Cast-iron cover may be rotated to give cable entry from any of four positions.	Cartridge housings give ample grease storage and easy dismantling. Securely locked against shoulders by bearing nuts

BROOK MOTORS LIMITED
HUDDERSFIELD

55.6

New advances

IN THE FOOD INDUSTRY WITH

ElectroniK

Temperature Measurement

Brown ElectroniK instruments are performing in modern factories throughout the world with a speed . . accuracy . . and sensitivity never before thought possible. ElectroniK instruments replace mercury or vapour thermometers and ordinary wire takes the place of capillary tubing. Complete interchangeability of thermocouples and resistance thermometer bulbs excludes the possibility that a vital instrument in the process line will be inoperable because of breakage. Brown ElectroniK temperature measuring instruments can be mounted at a distance from a process without sacrificing response speed or measurement accuracy. ElectroniK measurement concentrates ALL essential information on one panel to increase operating efficiency.

Features of ElectroniK Instruments

Capillary Tubing eliminated
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Measurement at a distance
Centralised recording
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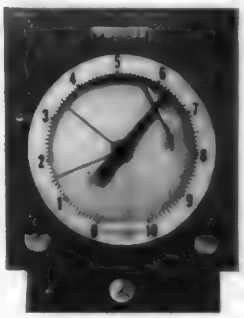
Greater sensitivity
Higher accuracy
Faster response

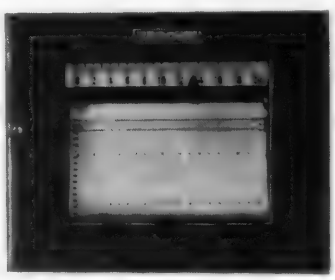
For further information on ElectroniK instruments write to Honeywell-Brown Ltd., 1 Wadsworth Road, Perivale, Greenford, Middlesex. *Sales Offices located in the principal cities of Britain and throughout Europe.*

Honeywell
BROWN INSTRUMENTS
First in Controls

Brown ElectroniK Single or Multi-point Precision Indicator. Self-balancing with integrally mounted push-button switches.



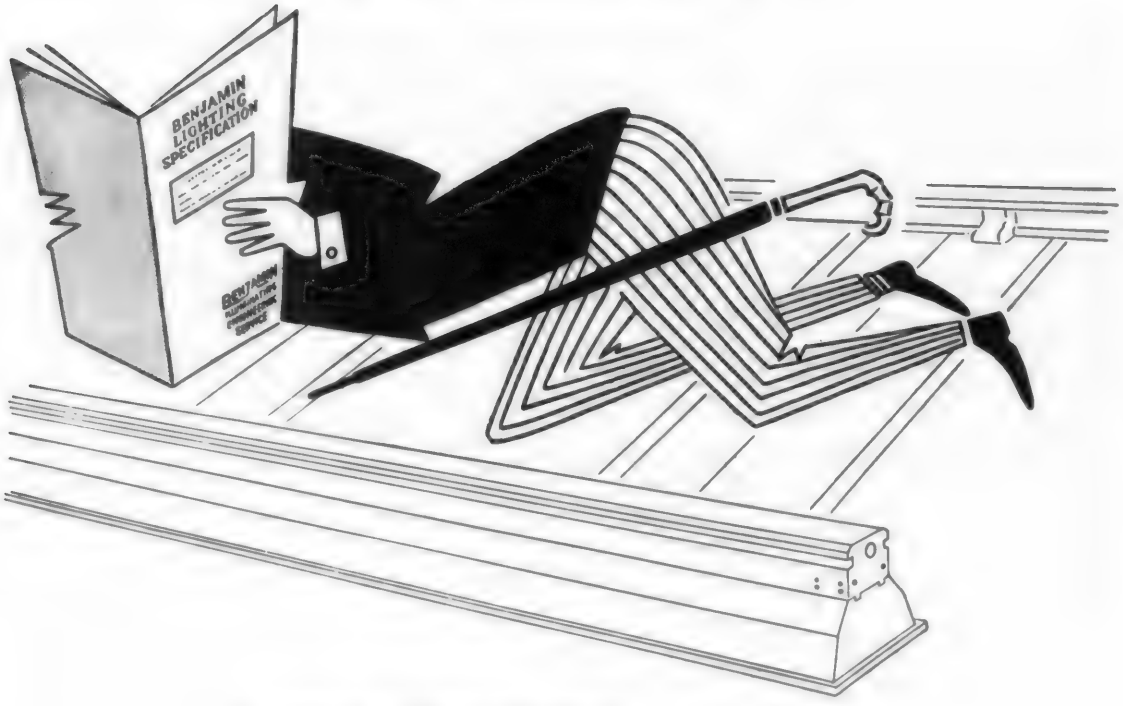
Brown ElectroniK Circular Chart Potentiometer Recorder Controller.



Brown ElectroniK Single or Multi-point Strip Chart Potentiometer.

READING BETWEEN

THE LINES . . .



. . . of a Benjamin Lighting Specification, it's obvious that Benjamin are particularly well-informed when it comes to tungsten and fluorescent lighting. Backed by years of intensive research, a Benjamin specification points the way to mobilising light as a business-builder . . . ensures the finest possible seeing conditions* in factory and office, shop and showroom.

Whatever your particular lighting problem, let Benjamin plan a tungsten or fluorescent scheme to fit *your* needs. Write for details.

BETTER LIGHTING BY

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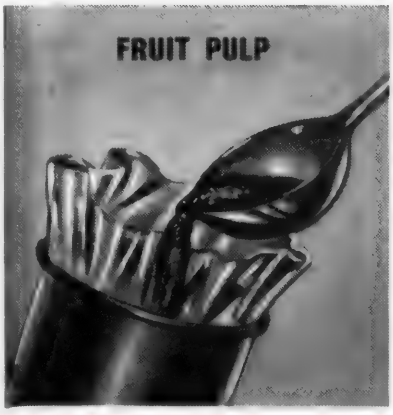
LEEDS: 49 Basinghall Street, Leeds 1. Tel. LEEDS 25579

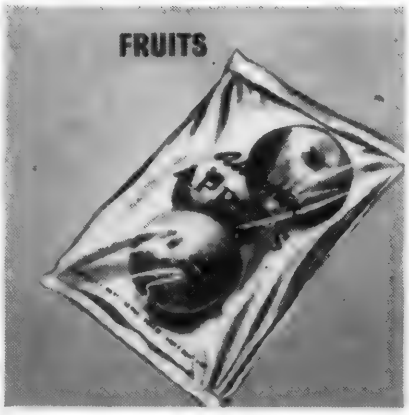
Smee's 20/54

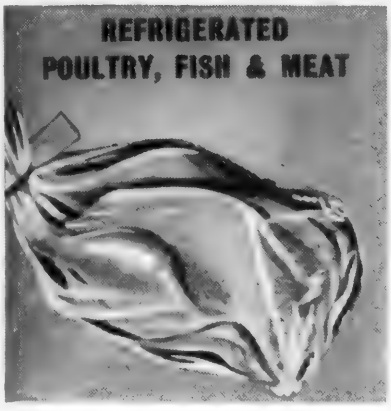
Could Diothene be used

(Polythene)

for your product?







TRANSPARENT . . . for eye and appetite appeal . . .

TOUGH for protection . . . completely HYGIENIC

Diothene is a new, transparent flexible film with outstanding qualities for the packaging of food either in bulk or in packs for the counter. It is tough—does not easily tear or puncture; it is transparent—shows the contents attractively; it is sterile—has no odour, is non-toxic and cannot taint the contents. Diothene is moisture-proof, liquid and sift proof, can be sealed easily and is unaffected in deep-freeze storage. Diothene can be supplied in quite small bags suitable for counter sales or in heavy gauge bags suitable for large quantities.

Flexible Packaging Ltd at their factory at Portsmouth, manufacture the Diothene film, make up bags to exact specifications in any quantities and print in multi-colour—all under one roof.

This service assures prompt deliveries and competitive prices. And because Flexible Packaging Ltd are now a subsidiary of The Metal Box Company, users of Diothene can take advantage of Metal Box design and research facilities—the most extensive in the country covering packaging requirements.

MB DIOTHENE (POLYTHENE)

DIOTHENE WILL KEEP IT CLEAN

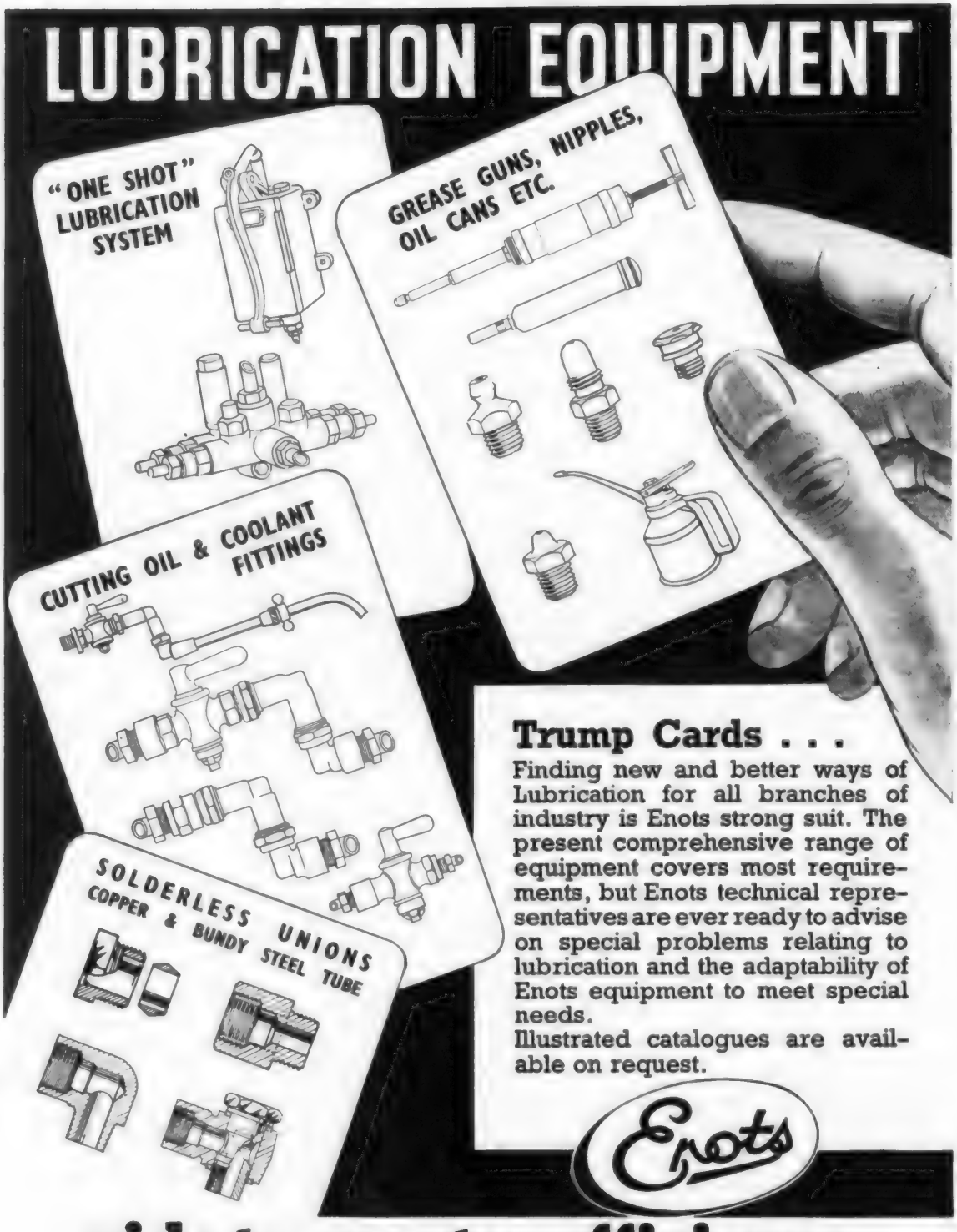
THE METAL BOX COMPANY LIMITED

Flexible Packaging Division

THE LANGHAM • PORTLAND PLACE • LONDON • W.1 ***TEL: LANGHAM 2040***

FP2331

LUBRICATION EQUIPMENT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Trump Cards . . .

Finding new and better ways of Lubrication for all branches of industry is Enots strong suit. The present comprehensive range of equipment covers most requirements, but Enots technical representatives are ever ready to advise on special problems relating to lubrication and the adaptability of Enots equipment to meet special needs.

Illustrated catalogues are available on request.

Enots

aids to greater efficiency

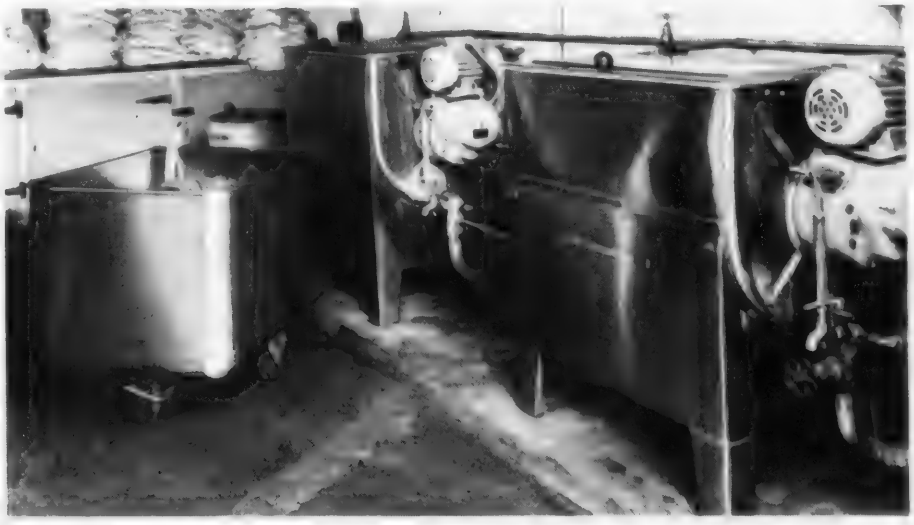
BENTON & STONE LTD., ASTON BROOK STREET, BIRMINGHAM, 6. ENGLAND

..at BROWN, WILLS AND NICHOLSON LTD.

(producers of the famous "Beechwood Brand" meat products)

Electrolux

LAUNDRY EQUIPMENT washes "on the spot"



Hanging carcasses: *aprons and overalls soon get greasy, bloodstained and dirty. Each of the 400 employees of Brown, Wills and Nicholson Ltd. uses two white coats a week—and there are also hundreds of aprons, dishcloths and hand-towels to be washed.*

Electrolux Laundry Equipment — installed at Brown, Wills & Nicholson Ltd. — consists of one Laundry Truck, one Hydro-Extractor and two Washing Machines. A staff of two, operate this laundry on a full-time basis. The equipment is simple to use — an unskilled operator can use it after short instruction.

Electrolux Laundry Equipment (Washing Machine, Hydro-Extractor, Laundry Truck):

- provides a high-temperature wash—at boiling-point if necessary.
- reduces handling.
- saves delay in turn-around of work.
- reduces wear-and-tear.

Washing Machine handles 22 lb. dry weight in *one* operation. Heats its own water — by gas, electricity or steam — to correct washing temperature (180° F) or to boiling-point if required. No additional water heating plant needed.

Hydro-Extractor: capacity of 14½ lb. dry cloth weight. Sturdily built with pendulum suspension — smooth and *quiet* in operation.

Laundry Truck: capacity 53 gallons. For soaking and transporting laundry from Washing Machine to Hydro-Extractor. Made of chrome steel with smooth interior and rounded edges and corners. Foot-operated drain cock.

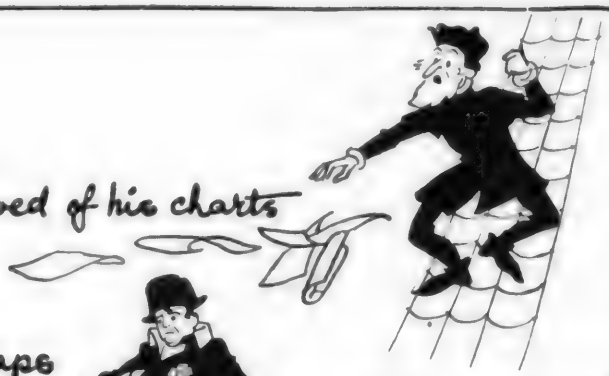
Electrolux *Excels* IN RELIABILITY

Designed for heavy duty and long life, Electrolux Laundry Equipment is a sound investment. Write to Contracts Dept. for full details of the Electrolux Laundry Planning Service.

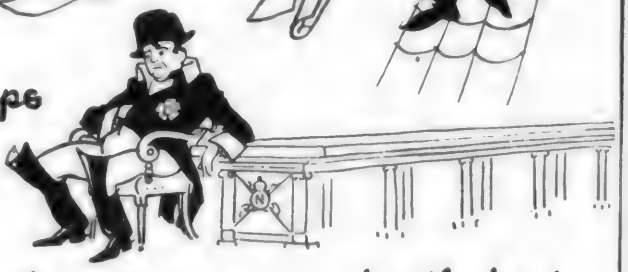
Electrolux Ltd., 153/5 Regent Street, London, W.1 Tel: REGent 7252 (9 lines)

We can easily imagine

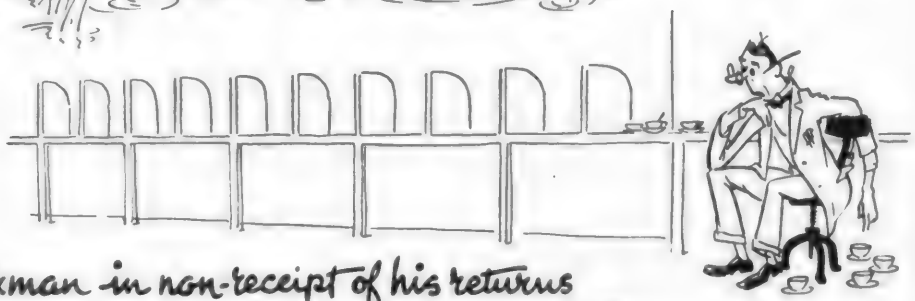
Christopher Columbus deprived of his charts



or Napoleon minus his maps

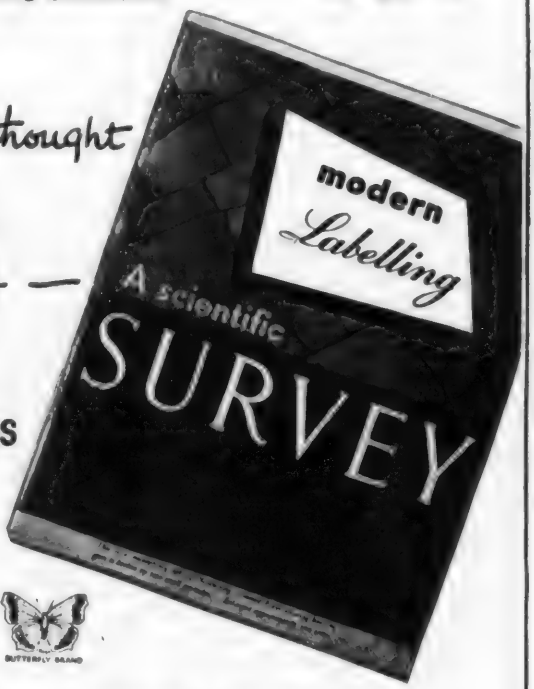


or Izaak Walton parted from his fly-book



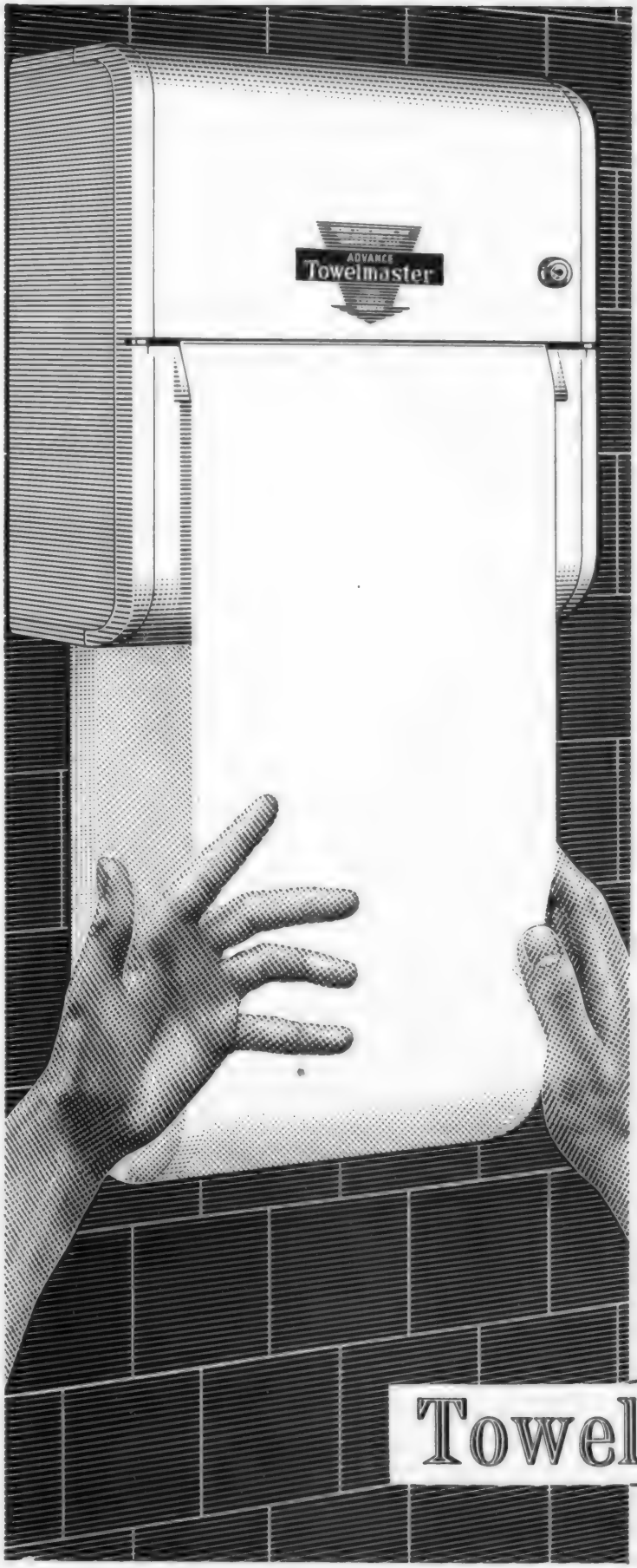
or even the taxman in non-receipt of his returns

But
we are utterly shattered by the thought
of the Manufacturing Executive
without a copy of —



We therefore invite those
EXECUTIVES of MANUFACTURING CONCERNS
who have not already done so,
to send for one of the remaining copies
of this **IMPORTANT MONOGRAPH**

SAMUEL JONES & COMPANY LTD.
NEW BRIDGE STREET · LONDON · E.C.4 · CEN: 6500



A clean soft dry towel for every pair of hands

How does the Towelmaster work?
A pull. Here's a length of laundry-fresh towel, enough and to spare for a really good dry. And as you pull, the used portion automatically winds into a separate compartment of the gleaming white Towelmaster cabinet. Nothing more efficient. Nothing more hygienic.

How much does the Towelmaster cost?
5/- per roll of towelling. Minimum usage only one roll per week. Installation is free. Maintenance is free. No replacement charges. In fact there are no other charges whatsoever.

How much is the Towelmaster worth?
Those few shillings give 180 pairs of hands an honest-to-goodness dry. Benefit staff and visitors alike. Give you 45 yards of *goodwill*. And what an infinitesimal price to pay for a clean bill of health!

What are your particular needs? We'll be glad to discuss them—without obligation.

ADVANCE

Towelmaster

Advance Linen Services Ltd. (Dept. T 28), Stratton House, Piccadilly, London, W.1. Telephone: Mayfair 8886

"WEDCO" WOVEN WIRE BELT CONVEYORS

serving The Food Industry

These illustrations show a few of the many food products that are being handled efficiently and economically by "Wedco" Woven Wire Belt Conveyors.

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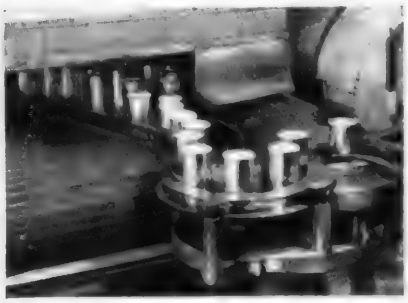
CANNED FOODS



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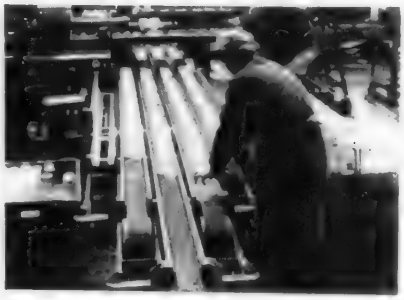

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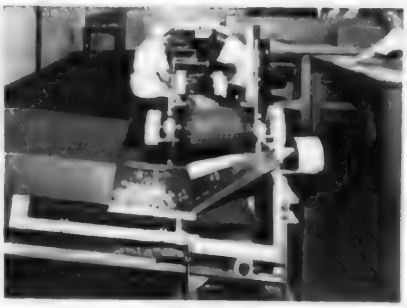

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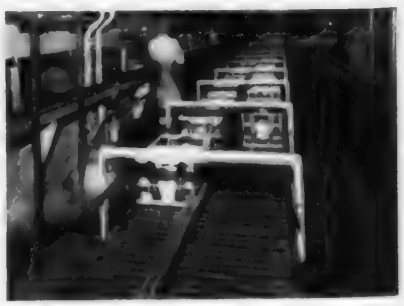

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FOOD MANUFACTURE

Vol. XXX. No. 3 · Published Monthly · March 1, 1955

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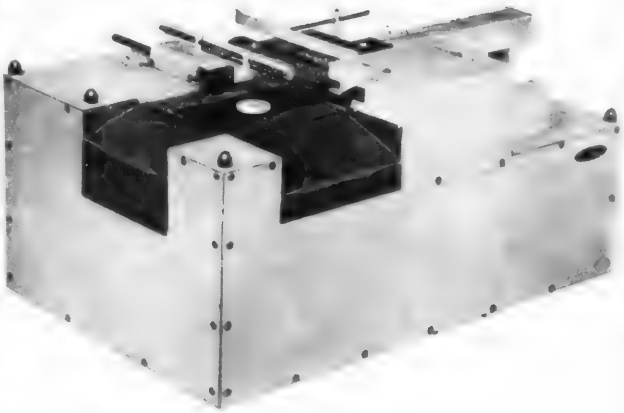

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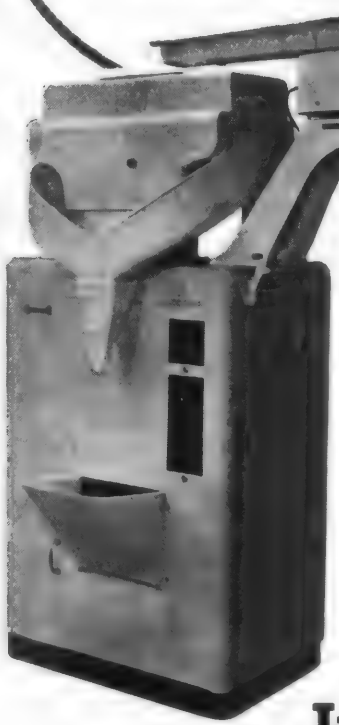

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FOOD MANUFACTURE

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Freezing fish at sea

An early start has been promised to the projected "quick freezing at sea" experiments sponsored jointly by the D.S.I.R., the White Fish Authority and the British Trawlers Federation. These bodies have chartered a trawler for one year from November last, to test out at sea over a fishing season the special equipment designed by the D.S.I.R. scientists at the Fish Research Station at Torry, Aberdeen. Torry has long argued that the solution to many of the industry's problems was to freeze at sea, and work has been going on there for many years to design a suitable, compact, efficient, limited-space unit capable of freezing and holding the catches likely to be made on an average trawler trip. These proposals are now being put to the test, and from this period of practical experiment it should be possible to determine just how effectively the system can be put into practice. The trawler chartered for this work has now been equipped with the newly designed plant, and will sail from Hull shortly on her first trip. It is hoped to freeze the early catches and so allow the trawler to stay at sea longer, fishing more intensively and bringing back a heavier landing, with consequent reduced spreadover of the costs. If it is proved from the season's work that quality fish and more fish can be expected, and that the market will pay for better quality, the way would seem clear for adoption of freezing at sea even on the smaller trawlers. Successful quick freezing at sea has been achieved by the ship *Fairtry*, but this is a large and specially designed and equipped factory vessel. The present work is intended to demonstrate the feasibility of equipping smaller trawlers with quick-freezing plant. An example of the vertical plate freezer developed at Torry was illustrated in Food Manufacture, January (p. 13).

Utilisation of whey

The problem of utilising whey was referred to in our January issue in an article describing the method of drying whey to produce a high-class feedingstuff for calves, pigs and poultry. That this problem is also receiving close consideration in Canada is evident from the annual report for 1953 of Ontario Research Foundation, which describes the possibility of producing from whey commercial grade lactic acid and a yeast high in complex proteins.

After reporting the Foundation's success in producing lactic acid from whey the report declares that the production of this acid will not entirely solve the whey problem, partly because the cheese factories of Ontario are relatively small in size and scattered over the eastern counties. To send whey into streams merely to create pollution problems is an unjustifiable waste because whey is an ideal medium in which micro-organisms grow with great rapidity. This simple fact, the report points out, is demonstrated by the speed with which milk turns sour. The Foundation is therefore exploring the possibility of using whey plus inorganic and cheap ammonium salts to yield a yeast high in complex proteins which are of nutritive value in the diets of domestic animals. Much useful and encouraging background information is available in the literature, and the Foundation's experimental work is designed to determine more accurately the optimum conditions of growth and finally to obtain an approximate idea as to the economics of the process in Canada.

Explosive foodstuffs

Normally harmless materials become potentially dangerous when they are reduced to fine powder during processing, giving rise to the possibility of explosive concentrations of dust being formed. To prevent dust explosions the workrooms in which fine, inflammable powders are made and treated should be kept clean and free from deposits of dust which could be stirred up into dust clouds by the shock, for instance, of a small primary explosion in the plant.

A cautionary example of what can happen is given in the Annual Report of the Chief Inspector of Factories which appeared recently. It concerns a flour mill in which, as an experiment, pneumatic discharge apparatus was fitted to a bin holding 40 tons of flour. Something went wrong with the test and three men set about discharging the flour by hand. While this was going on an avalanche of flour poured out through an inspection opening of a

chute fitted to the bin for the pneumatic discharging operation, and appeared to tear a suspended inspection lamp from its connection. The short-circuit ignited the dust cloud which was formed, and in the explosion two men were badly burned. Another instance was reported of an explosion in a flour mill where the source of ignition could have been a short-circuit between the exposed wires of a connection for a light fitting which was known to have become detached. An elevator broke down and two men had to charge the bin by tipping sacks into it. A dust cloud formed inside the bin and in the vicinity of the defective light fitting. This suspended dust became ignited and both men were badly burned in the explosion.

The importance of considering the possibility of dust explosions when designing plants is illustrated with the case of a cocoa disintegrating plant which was planned with this specific hazard in mind. The disintegrated material was carried up a cooling tower by a stream of cold air. The lower part of this tower, which passed through an occupied room, was strongly built to ensure that it would not burst by the pressure of a dust explosion. The tower passed through the roof of the building and the upper part was fitted with silk panels to allow the air to escape and the cocoa powder to settle. This part was housed in a brick chamber on the roof of the building and provided with explosion reliefs. Thus, the weak upper part of the tower, which was incapable of withstanding the pressure of an explosion, was isolated from the occupied parts of the factory underneath. When an explosion did occur the plant behaved as it had been designed to do; the flame and blast of the explosion were safely vented to the open air and no one was injured.

Crystals in canned fish

AN EXAMPLE of the assistance given to the South African fish canning industry by the Fishing Industry Research Institute in Cape Town concerns struvite crystals, the bugbear of rock lobster canners. These glass-like magnesium ammonium phosphate crystals form in the flesh of the fish any time from 24 hr. to six weeks after it has been canned. Although the crystals can be eaten they naturally frighten consumers who think that the canners have carelessly allowed ground glass to enter their packs.

The Institute tackled the problem of preventing the formation of these troublesome crystals and found the answer in sodium hexametaphosphate, normally used in boiler water to prevent scaling. Added in small quantities to each can, the hexametaphosphate formed a soluble complex with the magnesium ammonium phosphate crystals which did not crystallise and in no way impaired smell or taste. The Institute's satisfaction in solving the canners' problem was only slightly tempered when it was learned that the same remedy had already been found in the United States and patented by the inventors.

Tasty calories

A REMINDER of the way in which the Ministry of Food utilised the most modern knowledge of nutritional science to keep the nation properly fed during the war, is given by Dr. Magnus Pyke in last month's issue of *Discovery*. Dr. Pyke's reminiscing is prompted by the approaching amalgamation of the Ministry of Food with the Ministry of Agriculture. This, coupled with the fact that it will soon be just ten years since the Ministry's wartime work ended, provides the excuse for a little monument in words to the nutritional achievement of 1939-45.

Dr. Pyke recalls that in the 1914-18 war nutritional science was almost ignored by the Ministry of Food and that "fortunately for us, the war ended before the full results of our nutritional unpreparedness had time to develop fully." Between the wars a great deal of fresh light was shed on calories, vitamins, proteins and so on and, armed with these data, the late Sir Jack Drummond set forth in 1939 on his task as scientific adviser to the new Ministry of Food. The primary scientific duty of the Ministry was to assess the total national need for calories; the figure arrived at was 2,980 per head per day. In 1941, however, a new assessment of 2,550 calories was arrived at with data provided by the U.S. National Research Council. In terms of food the difference of 430 calories represented nearly 2 million tons of wheat or 700,000 tons of lard per year for a population of 40 millions.

Calorie and vitamin yields were the yardsticks by which the value of food was measured by the Ministry and these determined the transfer of land from the feeding of animals to the growing of potatoes and other crops for direct human consumption, and the pattern of our wartime food imports. In the event, the national food supply throughout the war was above the level of 2,550 calories considered satisfactory. Indeed, it steadily improved from a gross average of 2,800 calories in 1940 to 3,010 in 1944. However, Dr. Pyke freely concedes that calories are not enough. The food supply must not only provide enough calories but must also be of such attractiveness, palatability and variety that it is acceptable. The science of nutrition is not founded simply on physiology; it must also take account of psychology, sociology, anthropology and economics. It is by this standard that the Ministry's wartime achievement must be judged.

Atomic potato preservation

THE design of a plant for preserving potatoes for a year or more by exposing them to atomic radiation has been completed by scientists at the University of Michigan, under a contract with the U.S. Atomic Energy Commission. The first plant of its kind, it would be capable of irradiating 250 bushels of potatoes at an estimated cost of six cents a bushel. It could be built for less than $50,000 and operated for about $40,000 a year, including rental of a radioactive source.

There is no reason why such a facility could not be constructed in the next year, according to L. E. Brownell, professor of chemical and metallurgical engineering and supervisor of the university's Fission Products Laboratory. "Studies at Michigan indicate the wholesomeness of irradiated food, the process makes good sense economically, and a limited number of radioactive sources are now available. A potato-irradiating facility would make locally-grown potatoes available all the year to individual consumers and potato processors," said Prof. Brownell.

Such a plant would probably be built by processors or co-operative farm groups, preferably in a potato-producing area near existing or proposed atomic facilities. Using cooling fuel elements or radioactive by-products from a nuclear reactor as a source of radiation, the plant could be operated from six to eight months a year.

Truckloads of potatoes could be dumped on a conveyor belt to be carried on a 10 min. trip into a thick-walled chamber, pass the source of radiation, and out again. The dosage they received would destroy those cells in potatoes that cause growth. Although comparatively mild as food treatment dosages go, it would be fatal to man. The irradiated vegetables could be stored at 50°F. for many months without fear of their sprouting or rotting, said Prof. Brownell. Non-irradiated potatoes usually sprout after six months of storage, even at lower temperatures.

It is claimed that the process does not harm the potatoes, nor have over 2,100 taste tests given any indication of resultant off-flavours.

Economically, farmers would benefit by the increased storage life of their crop, for they could grow more potatoes and sell them throughout the year.

Firms preparing potato chips or canned or dehydrated potatoes could use local potatoes during the full year, as well, without relying on more expensive shipments from remote locations between seasons. A bushel of potatoes can be irradiated and stored for far less than the shipping cost of a bushel brought in from a distant growing area.

The proposed plant would consist primarily of a rectangular irradiation chamber and an adjoining one-storey area for a control room and office. The chamber walls would be 3 ft. thick and the radioactive source suspended in the middle of the room, above an 18-ft.-deep well of water. When not in use, the source would be lowered into the well to allow people to enter the chamber.

Potatoes would receive a uniform dose of radiation during their trip in conveyor belt buckets into the chamber at ceiling height, down beside the source, underneath it, up the other side and out of the room.

The Michigan engineers have planned for three possible radioactive sources for the plant: fuel elements left to "cool off" for a few months after being used in nuclear reactors; mixed fission products, the radioactive elements created in the reactor fuel; or Cesium 137, a single, long-lived fission product which can be separated from the others.

A British baker in the States

THE large number of advertisements and articles on continuous bread mixing that appeared in American technical journals during 1953 gave the impression that continuous bread mixing operations were actually taking place. This, however, was far from the truth. Describing his recent visit to the U.S. to study the industry, Mr. R. W. P. Hare, of London, writing in the *Bulletin* of the American Society of Bakery Engineers, said that his "thrill of anticipation" was brought down to earth on discovering that although more than two continuous bread mixing processes were being tried out, they were all still very much in their infancy and numerous teething troubles had still to be overcome. His conclusions concerning continuous bread production were that the two main advantages would be the saving in space and the uniformity of product. The other claims applicable to American bread did not necessarily apply to British bread, he added.

Comparing his personal impressions of the American with the British baking industry, Mr. Hare said that in the American plants there was much to see and learn, although in some respects the U.S. had something to learn from Britain. Bulk storage of flour had been installed in very few British bakeries, and the bulk delivery and metering of sugars and fats to mixers, although discussed for future development was not as advanced as in the U.S.

One interesting comparison made by Mr. Hare was the relative length of baking times in the two countries. The baking time for a standard 1¾-lb. loaf in this country is in the range of 37 to 43 min., the baking temperature approximately 450°F., the precise time varying according to the baker and

equipment used. In America, however, a loaf advertised as being baked slowly went through the oven for only 26 min.

The use of plastic material to prevent dough sticking to steel rollers is far more widespread in the U.S. than here, but pan coating seems to be much the same in both countries.

In the field of packaging and distribution, the U.K. is still behind America. Nevertheless, great progress in bread wrapping has recently been made in Britain, although "due to a reduction in price of a penny per loaf, 25% of the population still prefer unwrapped bread." The American handling of bread in unit containers after leaving the wrapping machines was more satisfactory than handling individual loaves, Mr. Hare added.

Butter makes a comeback

DESPITE the attractions of the new brands of margarine, including price reductions, butter is steadily regaining public favour. When fats were de-rationed last May, U.K. butter consumption was only 5,050 tons/week compared with 8,500 tons of margarine. In the following month butter made a slight gain, but margarine a bigger one to reach the year's highest weekly consumption of 9,400 tons. Since then, however, butter sales have climbed steadily, and by November they had increased to 7,000 tons/week, a rise of 40% over May, while margarine was back to the same level it stood at in May.

It would appear that the British public is slowly reasserting its preference for butter, but there is still a long, long way to go before the pre-war pattern of consumption returns; in those days nearly three times more butter than margarine was eaten. Indeed, it is by no means certain that butter will achieve such a superiority over margarine again. If it does it will not be the fault of the margarine manufacturers who have used every advance in science and technology to improve their products out of all recognition. Nor must it be overlooked that even though butter is only 1d. or 2d. per lb. more than when it was rationed and now sells at between 3s. 6d. to 4s. 2d./lb., margarine is as much as 2s./lb. cheaper, a bigger price differential than before the war when butter was more competitive with margarine pricewise.

However, these considerations should not detract from the real achievements of the butter industry since May. A 40% increase in seven months testifies to the effectiveness of the butter industry's selling drive. It is also significant that this increase has not been at the expense of margarine, a fact that reflects the continuing prosperity of the nation and its determination to afford its butter even at 4s./lb.

Dried milk centenary

A MILESTONE in the development of evaporated milk came just a century ago with Grimwade's patent of 1855 for a milk powder, a process which was the first to be used for several years on a commercial scale.

Before Grimwade's process opened a century of continued improvements, others had struggled with the problem of concentrating milk in some form or other with the two aims: that the milk should keep wholesome, and that the calcium caseinate should not form too much sediment on reconstituting the milk.

An English patent of 1835 by Newman, for example, used steam-heating and a current of air blown through the milk rather than in a falling-film evaporation. Yet this process used sugar to produce Newman's "honey-like" product. In 1842 *The Lancet* reported that dried milk had been prepared by a Russian worker named Dichort; yet although the milk was claimed to be reconstituted successfully, nothing further ensued from this report.

Eight years before his dried milk patent, Grimwade had produced a condensed milk bottled for use on government "Arctic expeditions" and similar ventures. This process involved using steam-jacketed pans and a partial vacuum during evaporation.

In his English patent of 1855 Grimwade added some sodium carbonate or other alkaline salt to the fresh milk and then evaporated it in open pans with constant agitation until a dough-like consistency was obtained. Sugar was added and the mixture was pressed into ribbons by passing between rollers before the final drying and pulverising. Grimwade appreciated the advantage of sugar even during processing, for it assisted granulation of the dough and thus facilitated removal of moisture during the later stages.

Evaporation in vacuum pans later superseded the open-pan method.

Grimwade's dried milk, like Borden's condensed milk patented in the United States in 1856 (Patent No. 15,553) which formed the technique adopted by the Anglo-Swiss Company, proved to be the basis for all subsequent research into this vital problem of preserving milk by condensing. Only much later came the solution of the final problem, namely that of adequately sterilising the milk so that addition of preserving sugar was unnecessary. In the United States at the beginning of this century there came the patent of Just, including the use of heated rollers for film drying milk, an idea also covered by Hatmaker in England.

Towards Better Dehydrated Potatoes

By E. G. B. Gooding, M.A., M.I. Biol.

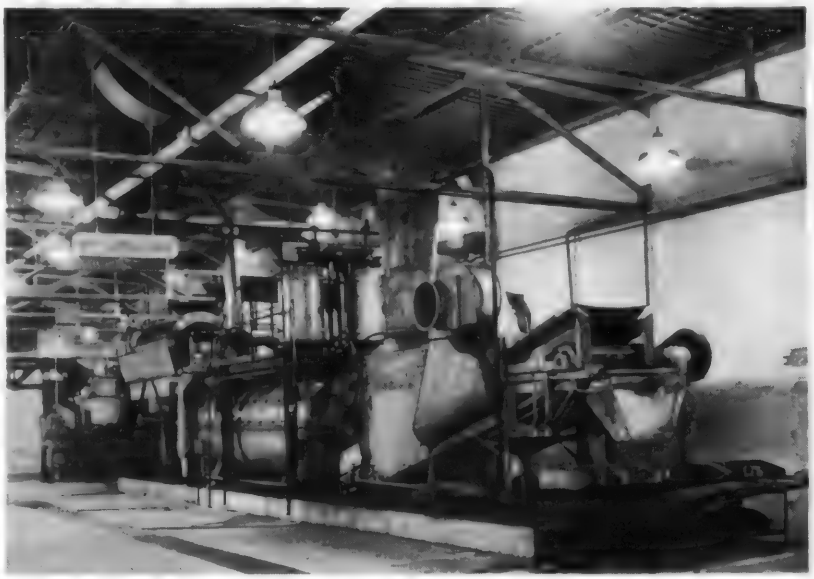
(*Ministry of Food Research Establishment, Aberdeen*)

In spite of considerable manufacturing experience, notably during the war, the problems of dehydrating potatoes have not all been solved. At the Ministry of Food Experimental Factory at Aberdeen, notable progress has been made towards improving manufacturing techniques for dehydrated potatoes in strip and dice form. A big effort has been made to improve the tropical storage life of the product and a new process, vacuum contact-plate dehydration, has been tried out and found to give a product more nearly approaching the ideal than do air-drying techniques. Here is an account of this research, the first of a number of reports on research at Aberdeen which we hope to publish from time to time.

RESEARCH on potato dehydration at the Ministry of Food Experimental Factory at Aberdeen arises from the general problem of producing compact stable foods for specific purposes. Dehydration has become accepted as the most effective method of reducing weight and bulk, particularly of vegetables, while at the same time conferring a considerable degree of stability. During the 1939-45 war large quantities of dehydrated foods were produced for and used by the Services, and production of these foods for the Services, though on a much smaller scale, continues today. The civilian market, too, is showing some interest in dehydrated vegetables.

A high proportion of the dehydrated vegetables which left the factories during the war were of satisfactory culinary quality and could without difficulty be cooked to give acceptable products. Frequently, however, they proved to be unacceptable or almost so by the time they reached the consumer. It was evident that the problems of dehydration were by no means solved, and the work at Aberdeen is largely directed towards the solution of these problems.

Dehydrated potato is probably the most familiar dehydrated vegetable and it is the one used in greatest quantity by the Services. It is usually supplied in one of three forms—a powder, which on the addition of hot water reconstitutes to form a material closely resembling creamed potatoes, or strips or dice which, after an appropriate period of soaking in water, can be cooked to resemble strips or dice of the potato from which they were cut. Research at the Experimental Factory is confined to the latter forms.



Processing line in vegetable dehydration plant. From left to right—strip cutting machine for root vegetables, shredder for leafy vegetables, inclined conveyor, washer, water scalder with tanks for dosing solutions above it, cooler and tray loading tables.

The approach to the ideal dehydrated potato

If it were possible to make an ideal dehydrated potato it would have the following combination of properties:

rapid reconstitution to give a cooked product resembling fresh potato, as usually cooked and served, in appearance, flavour, texture and nutritive quality; a long storage life under a wide range of temperature conditions; a high packing density and low manufacturing costs.

The strips or dice produced by the methods developed during the war in some measure meet these criteria, but fall short of the ideal. Strips according to the specification for Service supplies are required to have cross-section dimensions of 3/16 in. × 5/16 in.; these strips require 1-2 hr. soaking in water, followed by about 15 min. boiling, for satisfactory reconstitution. If efficiently prepared, from a suitable variety of potato, the cooked product is attractive, similar in appearance and

texture to cooked strips cut from fresh potato, and the flavour is usually similar, though there is sometimes a slight odour and flavour characteristic of dehydrated potatoes. The calorific value is high, but there is some loss of vitamin C.[1] When the dehydrated product is packed in nitrogen in gas-tight containers deterioration under temperate conditions is slow and the product remains acceptable for about 2 years. Under tropical conditions, however, the storage life is short; at continuous temperatures of 100°F. it varies from 2-6 months. The packing density of dehydrated potato strips is fairly high, 15-18 lb./cu. ft. The cost of production is not excessive; although labour and processing are considerable, these are to a large extent offset by the relatively small quantities of packing materials necessary for a highly concentrated foodstuff. Potato dice have similar properties to strips, but have the advantage of a considerably higher packing density, about 25 lb./sq. ft.

The most serious defect is the short storage life at tropical temperatures. The major factor determining acceptability of dehydrated potatoes stored at high temperatures is the development of the so-called non-enzymic browning, which is initiated by reactions involving reducing sugars and the amino groups of amino acids and possibly of some proteins. These reactions have high temperature coefficients, and are influenced by the moisture content and sulphur dioxide content of the foodstuffs. In particular, reduction of the moisture content greatly reduces liability to browning.[3]

Reduction of moisture content

During the past two years, attempts have been made to reduce the susceptibility of dehydrated potato to browning, mainly by attempting to dehydrate to lower moisture levels than were formerly obtained. Current specifications for potato supplied to the Services require the moisture content to be not more than 8%, with a "target" of 5%; the difference between the maximum and the target is due simply to the fact that it is extremely difficult to achieve a moisture content of 5% with present day drying methods. In the Experimental Factory, the driers, although working on the conventional principle, in which heated air is blown over trays of scalded potato strips, differ somewhat from most existing systems in that they form a 3-stage tunnel, with an initial high temperature zone (210°F.), an intermediate zone operating at an intermediate temperature (170°F.), and a final zone at the lower, and usual, finishing temperature of about 150°F. These driers have proved themselves to be effective, and dry 3/16 in. × 5/16 in. potato strips to about 6·5% moisture content in about 5¼ hr.; the standard dehydration tunnels used during the 1939-45 war required about 7 hr. to dry similar strips to 7-8% moisture content.

Although a moisture content of 6·5%, achieved in a relatively short time, is an improvement on earlier results, it is not sufficiently low to confer a really long storage life at high temperatures, and further reduction of moisture content is essential. An extensive series of experiments showed that it was quite impracticable to dry potato strips of 3/16 in. × 5/16 in. to 5% without some form of additional finishing, and experiments were then made with two types of finishing driers. In each case the principle was to blow air vertically through beds of dehydrated potato strips, taken after the second stage of drying at a moisture content of 11-12%. The beds might be shallow (4 or 6 in.) or deep (about 5 ft.). A range of temperatures and air velocities was tried; the most satisfactory results to date have been achieved with temperatures of 130-140°F. and air velocity of 100 ft./min. for "shallow beds," and 150 ft./min. with the deep beds. Drying for 6-8 hr. under such conditions has yielded dehydrated potato of about 5·5% moisture content. Continuing the drying further has usually led to browning. Storage tests at present in progress are showing that when the moisture content has been reduced in this way the product is less liable to browning than corresponding material of 6·5 to 7% moisture content.

Another approach to obtaining a drier material has been to cut strips more thinly, and strips of 3/32 in. × 5/16 in. have been compared with strips of 3/16 in. × 5/16 in. It has been found that cutting the strips more thinly has led to

i. a decrease in yield of about 10%,
ii. under similar tunnel drying conditions to the above a reduction in moisture content to a level of 4 to 4·5%,
iii. very much greater resistance to browning—little or no browning has been found after 12 months at 100°F.,
iv. a reduction in reconstitution time, no soaking being necessary and cooking requiring only 10-15 min.,
v. a decrease in culinary quality, apparently due to the translucent ribbon-like appearance of the thin strips on the plate,
vi. a slight increase in liability to fragmentation during packaging and transport.

In connection with iii it has been found that resistance to browning results not only from the low moisture content, but very largely from the greater leaching of solutes from the cells of the tissues during the scalding stage of the process.

The adoption of thin strips could be one way of increasing tropical storage life, though it would be attended by certain disadvantages. Any procedure which leads to increased loss of solutes is probably undesirable: there must be loss of nutrients and, although it has not been clearly demonstrated in potato, some loss of flavour. The poorer appearance has already been noted. The greatly reduced reconstitution and cooking time, instead of being an improvement, has been a disadvantage in large scale cooking, as material near the hot surfaces of the cooking vessel could be cooked to a mush while

Three drying cabinets forming, in effect, a three stage tunnel drier. The first cabinet holds 1 batch (two trolleys with trays carrying about 550 lb. scalded potato), the second and third cabinets, four batches each. A typical drying cycle for potato is for a batch to have 35 min. in the first cabinet with dry bulb temperature 210°F. and wet bulb 135°F., 2 hr. 20 min. in the second cabinet with dry bulb 170°F. and wet bulb 125°F., and 2 hr. 20 min. in the third cabinet with dry bulb temperature 150°F. and wet bulb 90°F.

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the water in the centre of the pan was still cool.

Lowering of reducing sugar content

The fact that increased leaching has led to so great a resistance to browning is almost certainly due to removal of reducing sugars from the potato strips. It has been realised for some years, particularly in the U.S.A., that the concentration of reducing sugars in raw potatoes profoundly affects their dehydration properties, and during the war recommendations were made in the U.S.A. concerning the use of stocks of raw potato low in reducing sugars.[5] It is well known, largely from work done in this country (*e.g.*,[2]) that if potatoes are subjected to low temperatures during the storage period between harvesting and use, the reducing sugar content rises considerably. Recent work at Aberdeen has confirmed this, and has shown very strikingly that potatoes taken from clamp after a cold winter spell gave a dehydrated product which was very much more liable to browning during subsequent storage at 100°F. than was material taken from clamp before the cold spell, or taken some weeks later. It has also been shown that if potatoes with a high concentration of reducing sugars are put into store at 65-70°F. for about two weeks immediately before processing, the reducing sugar content is lowered and the storage life of the product is enhanced. This "conditioning" is widely practised by manufacturers of potato crisps in U.S.A., and it is apparent such a process could, with advantage, be applied to potato dehydration to improve the tropical storage life of the finished product.

Effects of dimensions of strips or dice

That the dimensions of potato strips may have a profound effect on the properties of the product has already been mentioned. In addition to the comparison already discussed between strips of 3/16 in. × 5/16 in. and 3/32 in. × 5/16 in., strips of 1/4 in. × 3/8 in., 1/8 in. × 3/16 in., and dice of 3/8 in. cube, 1/4 in. cube, 5/16 in. × 5/16 in. × 3/8 in., 3/16 in. × 5/16 in. × 3/8 in., and 3/32 in. × 5/16 in. × 3/8 in. have been studied on the pilot plant scale and some on commercial scale plant. The generalisation holds for all, that the rate and extent of drying attainable and the rate of reconstitution are dependent on the smaller dimension: the thicker the portion, the slower is the drying, the higher the final moisture content (with its implications for tropical storage life) and the slower the rate of reconstitution. Experiments on commercial scale plant have shown the yield of strips 1/8 in. × 5/16 in. to be about 7% less than that of 3/16 in. × 5/16 in. strips; that of 3/32 in. × 5/16 in. strips to be some 10-12% less; that of "half-dice" of 3/16 in. × 5/16 in. × 3/8 in. to be about 8% less, and of "quarter-dice" of 3/32 in. × 5/16 in. × 3/8 in. to be some 40% less. In all cases, especially the dice, mechanical loss of fragments through the perforated drums of the washing and blanching equipment, and past scrapers on conveyors, was responsible for a considerable proportion of the increased losses for the thinner strips and dice—especially the "quarter-dice." The packing density of the strips becomes very slightly less with thinner dimensions: with the dice it is some 50% more than that of strips—viz. about 25 lb./cu. ft.

Study of scalding

The main purpose of scalding before dehydration is usually considered to be the inactivation of enzymes which would otherwise catalyse reactions leading to poor colours and off flavours in the dehydrated product. With water scalding, as practised in Britain, leaching out of some of the solutes from the vegetable tissue is inevitable, and, as has been said above, this leaching is in many ways undesirable. Attempts have therefore been made to inactivate enzymes by other methods—treatment with enzyme poisons applied as liquids or gases—and to reproduce other effects of scalding, for example, filling of the intercellular spaces by evacuating the tissue under water, and breaking down

the protoplasm by freezing. Some of the potatoes dehydrated after such treatments as these were of excellent colour, and they took up the normal amount of water on reconstitution, but, without exception, they remained hard and inedible even after prolonged cooking. It appeared that not only was a heat treatment before dehydration valuable for enzyme inactivation, but it was essential for the attainment of proper texture in the cooked product.

Leaching may be reduced by scalding in steam instead of in water, and a steam scalder has just been put into operation at Aberdeen for a comparative study of the two methods.

Varieties suitable for dehydration

During the 1939-45 war a number of varieties of potato were used for dehydration; the results obtained in the factories confirmed the recommendations made by the Department of Scientific and Industrial Research and the Ministry of Food that the variety King Edward grown on silt land was the most suitable. Recent observations at Aberdeen suggest that this is still so: King Edward potatoes grown either in Scotland, in Leicestershire, or in the Fens have given a bright and attractive product, definitely superior to that obtained from what is generally recommended as a "second choice," the variety Majestic. Arran Pilot, Craig's Royal, Stormont Dawn, Kerr's Pink and Dr. McIntosh have all given poorer products than either King Edward or Majestic.

Vacuum contact-plate dehydration

Much of the foregoing has been in the nature of relatively short-term research: studies which might be expected to give results in two or three seasons which would be applicable to present day equipment and methods—though it should be emphasised that when results are to be measured in terms of storage life, no very quick answers can be obtained.

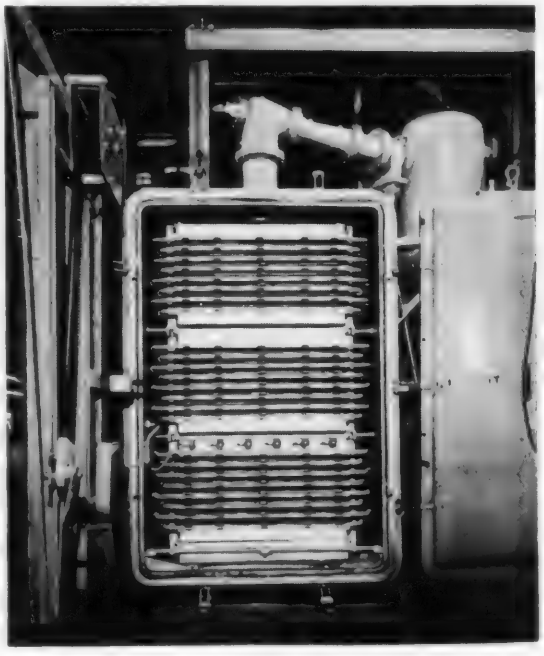
Longer term studies are being carried out, using new equipment and methods. In this category comes the study of the vacuum contact-plate dehydration process, which is essentially dehydration *in vacuo* between movable pairs of heated plates, which can be brought together to maintain thermal contact on the upper and lower surfaces of the layers of foodstuff being dried. The technique, as applied to potatoes, has certain advantages over air drying methods. Rapid evaporation of water under low external pressures keeps the temperature of the tissue very low for most of the period of dehydration, and there is some evidence that this will improve the tropical storage life of the product. If the operation of the temperature and vacuum controls is suitably carried out, the rapid production of steam within the tissues leads to the formation of internal cavities, which greatly accelerate the rate of reconstitution of the dehydrated product, and which allow the dehydration (and subsequent reconstitution) of much larger portions of vegetable. For example, potato dice of 5/16 in. × 5/16 in. × 3/8 in., when air dried, require at least 2 hr. soaking in water, followed by 20 min. cooking, for adequate reconstitution and even then hard cores are frequent. Dice of these dimensions may be vacuum dried to give a product which can be cooked in about 20 min., without any prior soaking period.

Larger portions do require soaking in water before cooking—but larger portions could not have been dried at all by conventional methods: examples of the larger portions are potato slices 1/4 in. thick and strips 1/2 in. × 1/2 in. in cross-section; the latter, when reconstituted, boiled for a short time, and then fried in deep fat, yield satisfactory "chips."

The vacuum contact-plate dehydration process is still in the experimental state and its future probably depends less on its effectiveness with potatoes than on its suitability for certain other products, in particular fish, meat[4] and fruit, but even in its present state of development the process is highly versatile and shows great promise. Should it be applied commercially, dehydrated potatoes will be among the commodities that will benefit.

Present status of investigation

In closing, then, it may be said that research at Aberdeen has been mainly directed towards increasing the tropical storage life of dehydrated potato strips and dice.



The vacuum contact-plate cabinet used for the dehydration of vegetables, fruit, fish and meat at the Experimental Factory.

Browning during high temperature storage has been reduced by lowering the moisture content of the dehydrated product by means of more effective drying procedures, and by the use of strips cut more thinly than usually specified. It has been shown that, even in the comparatively mild British climate, a cold spell leads to a substantial accumulation of reducing sugars in raw potatoes, and that this renders the dehydrated product exceedingly susceptible to browning during tropical storage. In the course of work on conditions affecting storage life a study has been made of the various effects of changing strip or dice dimensions on the properties of the product. Scalding, too, has been investigated and it has been shown that a heat treatment prior to dehydration is essential for satisfactory texture when the dehydrated potato is subsequently reconstituted and cooked. King Edward remains outstandingly the best variety for dehydration. Vacuum contact-plate dehydration is a new and promising method of drying which gives a product more nearly approaching the ideal than do air-drying techniques.

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Indian Food Laws

FOR many years the differences in the standards for foodstuffs laid down by the various Indian State Governments have been interfering with inter-provincial trade. Of the 27 States in the Indian Union, 22 have their own food laws or are applying those of neighbouring States. Realising the need for a detailed examination of the problem the Central Advisory Board of Health, Government of India, appointed a Food Adulteration Committee in 1937. To standardise the methods of analysis and to recommend suitable standards for different foods, the Committee recommended the formation of an expert body called the Central Committee for Food Standards, which started work in 1944. Another recommendation of the Food Adulteration Committee was the enactment of a central legislation to ensure uniformity in the enforcement of food laws in the different Provinces. With the inclusion of "Adulteration of foodstuffs and other goods" in the concurrent list of the Constitution of the Indian Union, it became possible for the Central Government to enact an all-India legislation on this subject and, in 1952, the Food Adulteration Bill (1952) was introduced in the House of the People. When this Bill has been passed the task of prescribing appropriate standards for all food articles will have to be undertaken. It is therefore useful and timely that the Central Food Technological Research Institute, of Mysore, has published a summary* of the existing Food Laws and Food Rules which are scattered in manuals, gazettes and publications of State and Central Governments.

The book covers, as far as information could be obtained, all important details of the history and operation of Food Laws, definitions, descriptions and chemical standards of articles of food, permissible additives such as colours, flavours and preservatives, and labelling. The laws summarised relate mostly to articles of food other than fruit and vegetable products, which are governed by the Fruit Products Order, 1947, and no attempt has been made to deal with legal aspects or with the existing provisions for the control of food production and distribution under hygienic and sanitary conditions.

A number of tables of comparative data on the prescribed chemical standards for foodstuffs are given. A separate chapter deals with the Vegetable Oil Products Control Order, which is a Central Order and applies to all India, except Jammu and Kashmir. A comprehensive subject index completes this valuable work.

* *Indian Food Laws.* Compiled by N. V. R. Iyengar, Dr. B. K. Sur, and Dr. G. T. Kale. Pp. 220+iii. Mysore: Central Food Technological Research Institute. Rs. 4/8 net.

Food—From Store to Plate

CHANGES in the American food market which have become particularly evident in the years since the Second World War are reflected in the latest edition of a book* which seeks to introduce students to the study of foods and nutrition by a course based on the scientific findings as they relate to selection at the market as well as to the effects of various forms of processing.

Consequently, the book begins with an explanation of the basic standards involved in the appraisal of foods and includes a section covering all the general information on this topic, both as it applies to the individual foods and to the combinations which are included in the day's or week's meals. This is followed by a second section consisting of two chapters on the methods of processing foods, and a third taking up the structure of food materials and its general relation to the changes involved in preparation for eating. The fourth and final section consists of chapters devoted to the selection and preparation of foods following the classification used in the Bureau of Human Nutrition and Home Economics' food plans.

Selected references are given at the end of each chapter which may serve as an introduction to further study.

* *Food Selection and Preparation.* By Marion Deyoe Sweetman and Ingeborg MacKellar. 4th Edition. Pp. 645+ix. Chapman and Hall. Price 52s.

The Baking Industry Adapts Itself to New Conditions

By D. W. E. Axford, Ruth Bennett, M. A. Cookson and J. B. M. Coppock

(British Baking Industries Research Association)

Conditions in the baking industry changed considerably during the last year and a great deal of legalisation, inevitably destined to affect it profoundly, was either enacted or proposed. Much discussion continued to centre on the question of chemical additives to foodstuffs and public opinion, often aggravated by faddists, was clearly still concerned with this topic, though possibly to a lesser extent than in previous years. During the year, bread sales, as indicated by the Ministry of Food's official figures for the consumption of National flour, which for the period January-September 1954 showed a fall of some 6% on those of the previous year, continued to decline. Biscuit production figures were, however, better maintained in general, declining by about 2½% on those for the corresponding period in 1953.

Legislation

THE most significant legislation affecting only the baking industry was the enactment of the Night Baking Bill which, although it does not become operative until January 1, 1957, will ultimately necessitate considerable rearrangements in the industry, affecting particularly the medium and small baker. When flour was first de-controlled in September 1953, it was clear that the full impact of the relaxations would only become apparent during 1954. Imported flour, which became freely available to the baker at a price lower than National flour, was naturally an attractive proposition of which some bakers took full advantage.

The derationing of fats led to the re-introduction of some pre-war products and the production of attractive new ones. More will be said on this later.

Inevitably, in common with other food manufacturers, bakers will be affected by the provisions of the Food and Drugs (Amendment) Bill, particularly relating to hygiene. In the revised draft of the hygiene regulations to be made under powers conferred by the new Act, certain items originally included have been omitted and some of them have been incorporated into a suggested code of practice. Such a code will not have legal force, but will probably be adopted as a guide towards improved conditions; indeed, this intention is clearly written into the new Act.

The statement of the Minister of Food that the use of agene is to be discontinued, which was fully noted in Dr. Amos' article on Milling in FOOD MANUFACTURE last month, has ended a long period of uncertainty and well illustrates the difficulties before our food legislators in dealing with such complex problems involving extensive pharmacological and nutritional investigations.

The Preservatives Sub-Committee of the Food Standards Committee recommended in August last that antioxidants should be confined to foods liable to oxidative rancidity and should not be added to any foods other than edible oils and fats and to essential oils. It was recommended that propyl, octyl and dodecyl gallates and butylated hydroxy-anisole (B.H.A.) be permitted and upper limits for the amounts to be used were proposed. (It is of interest to note that the Canadian Food Regulations were recently extended to permit the use of nordihydroguaiaretic acid (N.D.G.A.).) The Foods Standards Committee also adopted a report by its Metallic Contamination Sub-Committee which recommended that the maximum quantity of zinc in solid foods should be 50 p.p.m. (except gelatin, which is allowed up to 100 p.p.m.), and attention was drawn to the unsuitability of galvanised iron containers for storing and cooking foods.

Finally, a report has recently been presented to the same committee by its Preservatives Sub-Committee of which the main recommendation is that the Public Health regulations should be amended so as to permit the use in foods of certain specified colours only, in contradistinction to the present position wherein, with a few specified exceptions, the addition of any colouring matter to articles of food is apparently permitted. In this connection, it may be mentioned that the American Food and Drug Administration have recently recommended that Orange 1 and 2 and Red 32 be removed from its list of approved dyes.[16] Other F, D and C colours are also being investigated.

Nutrition

The results of experiments carried out in Germany in 1947 and 1948 by Dr. E. M. Widdowson and Prof. R. A. McCance, were given in detail recently in Special Report No. 287 of the Medical Research Council.

The report stressed that any conclusions drawn must be restricted to the setting in which the scientific evidence was obtained. In a series of experiments the growth and development of undernourished children aged 5-15 years was studied, the children being on a diet in which wheat flour or bread supplied 75% of the total calories for a period of one year. It was concluded that wholemeal flour, flour of 85% extraction, and white flour were equally nutritious, and that the enrichment of the white flour with B-vitamins and iron did not improve its nutritive value. In another series of experiments, no difference was found in the nutritive value of white bread, enriched white bread and wholemeal when these contributed 35% of total calories, and another 35% were derived from fat and sugar. In fact, the only case in which a difference in the nutritive value of the different breads was observed was when they were incorporated in a diet fed to weanling rats. In their final conclusion, Widdowson and McCance stated that "it is evident that diets containing much bread and little animal protein can be made highly satisfactory, and that a balanced diet, adequate in all its nutritional aspects, can be provided with minimal amounts of milk and meat, if plenty of wheat and vegetables are available. Never has better evidence been obtained that bread is the staff of life, a point which appears to be inadequately emphasised.

Several other extremely interesting papers on the nutritional value of bread and aspects of its enrichment appeared during the past year, and in this connexion attention should be drawn to the excellent review article on the role of wheat and wheat products in human nutrition by Hagsted, Trulson and Stare, which appeared in *Physiological Reviews*.[1] Considerable interest has been shown by Commonwealth countries recently in the possibility of utilising the vast surpluses of skimmed milk powder left from the production of butter to augment the diet of peoples whose standard foods are nutritionally deficient. These deficiencies are often most marked in proteins which would be given admirably by skimmed milk powder. Bread could form a substantial part of the diet of such peoples and would be a useful vehicle for the proteins of milk. Accordingly, much interest has been shown recently in the Commonwealth in furthering research to improve the skimmed milk powder for use in bread. In America, skimmed milk powder is, of course, a standard ingredient of bread to the extent of up to 6% on flour level, and much work has continued to be done there on its baking qualities.[2, 3, 4] Its inclusion in bread in countries where nutrition is not poor, *e.g.* in Australia, has been questioned on various grounds. Thus, unless used with fat, GMS, or additional potassium bromate, skimmed milk powder reduces loaf volume and gives a more solid crumb which would be less attractive than the bread to which we are accustomed. In addition, when nutritional policy has been towards providing an ample supply of fresh milk the economics of feeding milk by inclusion in bread has been stated as unsound according to an article in the Sept. 1954 issue of the *Australasian Baker*. Thus the main benefit of including milk in bread would appear to be to lend variety to the product.

Raw materials

The decontrol of flour enabled the baker to buy any grade of flour, *e.g.* white, patents, etc., that the miller produced. The mills continued to produce National flour, on which subsidy was subsequently allowed to the baker producing National bread. This flour had to be of 80% extraction, at which rate of extraction it would comply with what is regarded as nutritionally desirable amounts of vitamin B_1, nicotinic acid and iron. White flours (*i.e.* of lower extraction rate) had to be fortified with these essential materials to restore them to the levels found in 80% extraction flour. As white bread did not attract subsidy there was little sale, more particularly as during 1954 one of the main changes in the quality of National flour has been the steady alteration in colour grade towards the figures usually associated with 72% extraction flour. The wet harvest produced less sprouting of wheat than was at one time feared, and the diastatic activity of flour has remained at a satisfactory level.

Cake flours have been obtainable again, and renewed interest has arisen in the highly chlorinated cake flours used, especially for cakes containing a high-ratio of sugar and liquor to flour, for which they are essential. The decontrol of fats has added to this interest, because special emulsified fats are also needed for this type of high-ratio cake. Research has centred on evaluation of these cake flours,[5] determining the best method of preparation and the particular features which are of prime importance. The best cake flours are very fine, with low protein, and are chlorinated to modify the gluten. Imported Canadian high-ratio cake flours have been favoured by some bakers for certain types of cake, but with the experience gained during the year, there appears to be no reason why flour fully equal to this Canadian flour should not be made in this country.

One of the effects of decontrol has been that the biscuit maker can now pick and choose his flours and has consequently become more aware of the need for more accurate methods of testing flour. The use of dough testing instruments now often replaces the traditional gluten-washing in biscuit factory laboratories, and manufacturers are in a better position to ascertain how far the flour delivered conforms to their requirements. The necessity for more stringent control of raw materials, of which flour has been one of the most variable, has been enhanced by the modern packaging systems, which demand biscuit dimensions being maintained constant within quite close limits if the plant is to work well and maintain a uniform weight in a standard size package.

The importance of quality in

wheat was emphasised at a conference on Cereal Crops held by the National Institute of Agricultural Botany in Cambridge in December 1953 and attended by wheat breeders, farmers, and millers. It was stressed that wheats suitable for biscuit making must be grown. Instead of the miller having to take any wheat the farmer offered, the time would come when the miller could only sell to the biscuit maker flour of the type he wanted and so would only buy suitable varieties of wheat from the farmer, who might be left with the poor milling and baking varieties, even though these varieties had superior growing and yield characteristics. It was urged that the wheat breeders should concentrate on producing varieties of either good biscuit quality or good bread making quality combined with growing characteristics good enough to satisfy the farmer. It was time for a change from the emphasis placed since just before the war on producing new varieties primarily for their yield per acre.

The last year has been memorable in seeing the decontrol of oils and fats and a return to unlimited quantity accompanied by a variety in quality. The first step was taken on January 1, 1954, when the Oils and Fats (No. 2) (Amendment No. 2) Order, 1953, ended control over the processing, sale and use of some of the less important oil seeds and edible oils as well as wholesale licensing of margarine, cooking fats and lard. The Oils and Fats (No. 2) (Amendment and Revocation) Order, 1954, removed the remaining controls over the processing and distribution of oils and fats from May 9. A Food Standards (Margarine) Order came into force on May 16, prescribing that margarine not intended for made-up foods, cooking or sale to a caterer should contain vitamins A and D.

A wide variety of branded fats was once again available to the industry, many members of which were somewhat embarrassed at first by the large number of qualities offered with quite large price differences. If it is possible to assess a general feeling resulting from decontrol, it would probably be one of relief at the general improvement in quality following the cessation of allocated fats of variable composition and performance. In addition to branded cake and pastry margarines and compound fats there was a return in 1954 to shortenings for the making of the so-called high-ratio cakes, as has already been mentioned.

Three interesting developments occurred in the fat industry, all originating in America. A process was developed for refining lard to make it as efficient as vegetable shortenings and of a smooth, plastic consistency.[6] Another development concerned the production of edible spreads, which stay plastic over a wide range of temperature, by blending vegetable oils and monoglycerides.[7] The third, which may be similar in result to the second, was based on the introduction of the acetyl group into glyceride molecules; this results in low melting fats (termed acetin fats), which have a very good resistance to oxidative change and which function, according to their composition, as ordinary fats in normal edible uses.[8]

Yeast is now usually regarded as one of the baker's consistent raw materials, thanks to modern production methods, but competition is still leading to improvements. In one of these, the compressed yeast has been dried a little further so that extra activity was claimed—this was due simply to the decreased water content of a unit of product. In another, a different type of yeast originating in Holland became available. Owing to the strain and method of manufacture this was considerably more active to the extent that about 25% less of it was needed for the same baking results and its cost per lb. was little more than British yeast.

Considerably greater amounts of frozen egg and egg-whites were available during 1954, and were much in demand, while the position with regard to the supply of special grades of sugars also improved.

In the field of flavourings it is noteworthy that the use of coumarin has been banned for use in foods in the U.S.A., and also that a process has been described in which a liquid flavour is absorbed on a dry base of such characteristics that it can be easily distributed in the product to be flavoured,[9] a very useful idea for those interested in pre-mixes.

Bread improvement processes

There was much interest in 1954 in bread improvement using untreated flour, by variations in the dough making methods. A study of the "batter" process of Hay and Rank led to the conclusions[10] that the physical improvement obtained was due solely to the incorporation of atmospheric oxygen during high-speed mixing, the bleaching being catalysed by lipoxidase or other unsaturated fat oxidases; the same effect may also be obtained using conventional machinery provided the mixing is carried out in an atmosphere of oxygen. Another successful process was established in 1954 whereby a slack dough of about three-quarters of the flour and all, or nearly all, the water is mixed for normal dough-making times in conventional equipment, geared up if necessary to about twice the normal speed, before the remainder of the ingredients are added.[11]

The past year has also seen the commercial production of ascorbic acid in a suitably diluted form for use as a flour or bread improver; previously its use was limited by high cost and difficulty of handling due to the very small amount required; its value had been known for many years and it is similar in effect and amount required to potassium bromate. Some very interesting work on its influence on baking quality and the mechanism by which it acts has been described.[12]

Amylase supplementation of doughs for bread improvement is being commercially developed in America and arousing some interest here. Fungal amylase and protease tablets of standardised

strength are available allowing more accurate supplementation of enzyme requirements; many advantages are claimed for their use,[13] but in highly complicated matters of this sort careful analysis of such claims is most desirable. An interesting development concerns the use of bacterial α-amylase in breadmaking, as such treatment is said to confer improved resistance to staling. It is suggested that the heat stability of bacterial α-amylase permits its partially degrading gelatinised starch during baking and subsequent storage to a form which cannot stale.

Various improvers of the crumb softening type have been dealt with during the year. Two soya fractions have been found to possess this property,[14] and some literature has appeared on TEM (diacetyl tartaric acid esters of monoglycerides) which is claimed to be of such composition as to produce excellent bread improving properties.[15] Little further has appeared on polyoxyethylene stearate since the National Research Council in the U.S.A. decided that toxicological tests subsequent to the bread standards hearings had not conclusively proved its safety for use in food. The use of monoglycerides in bread and flour confectionery has been reviewed[16] and theories of their mechanism of action discussed. The natural occurrence of monoglycerides in flour and the pharmacological desirability of their use in baked products have also been considered.[17]

Advances in technology

The present position of "aeration" processes in breadmaking has been discussed in the preceding section. Another very interesting development in dough-making processes has been the progress of the "continuous-mixing" techniques developed in America. In the "Baker" process,[18, 19] a ferment is first made, which can be kept up to 36 hr., so that the ferment for the whole day's run can be mixed in one batch. Thereafter the ferment and each of the other ingredients are automatically fed in the correct proportions into a specially constructed mixer. The dough, after about 3 min. mixing, is extruded from the end of the mixer in dough pieces to make 1 lb. or 1½ lb. loaves—the pieces being carried straight to the tins. Thus, trough and floor space are saved. The elimination of normal fermentation times is achieved by the special ferment or yeast broth which is made on a batch system containing water, yeast, sugar, and ferments. The American Dry Milk Institute has also reported[20] a stable ferment process, the ferment consisting of a mixture of 70-73% water, 2% yeast, 0·5% yeast food, 0·4% malt, 3% sugar, 2·25% salt and 6% non-fat milk solids. This can be added to the rest of the ingredients in an ordinary batch-mixing system so avoiding the preparation of sponge doughs, a practice still widely carried out in American bread production, but far less so in British practice. The application of continuous mixing to the production of cake batters has also been discussed.[21]

Work to improve techniques involving refrigeration of doughs has continued and much progress has been reported[18] on the freezing of baked goods.

Bulk handling and storage of flour, sugar and fat has come increasingly to the fore, and the factors involved were discussed authoritatively in papers given at a joint meeting of the Chemical Engineering Group and Food Group of the Society of Chemical Industry held in March 1954[22] and also at the Technologists Conference of The British Cake and Biscuit Association held in October last. These developments in mechanisation are proving particularly attractive in the field of biscuit-making.

Much has been written recently about the possibility of sterilising foodstuffs by the radiations originating from radioactive materials or from high-power particle accelerators. The Society of Chemical Industry held a symposium at Cambridge on this subject in February 1954[23] and a useful review article has also appeared.[24] Cost would seem to be the primary limiting factor. The high energy accelerators known to sterilise foodstuffs quickly enough for commercial operation are too costly for general use in the food industry, and though radioactive wastes would be a cheaper source of sterilising radiation, their applicability remains to be seen.

Several articles on the effects of temperature and humidity in bread storage have appeared during the last year. One of these details results obtained on the effect of humidity by the American Institute of Baking.[25] As might have been expected, it was found that humidity control was relatively unimportant for bread wrapped in moisture-resistant paper. For unwrapped bread it was concluded that humidities of about 80% were required to retain a soft crumb, but if a crisp crust was desired this humidity would have to be lowered leading to more rapid crumb firming. The maximum humidity allowing the maintenance of a crisp crust depended on storage temperature and at 80°F. was 80%.

An interesting development has been the construction of an oven for bread and biscuit baking by the simultaneous action of high-frequency heating and infra-red radiation, which has been used on a commercial scale.[26] It has been claimed that the cost of baking is halved, output is trebled and a product of greater volume equal if not superior to that of ordinary ovens is obtained. Interest in these methods is considerable in Germany and Switzerland, and they may well prove to be important.

There have been considerable developments in cake mixes during the last year in this country, and several firms have products on the market. The use of monoglyceride—and polyoxyethylene—type emulsifiers in prepared cake mixes has been evaluated.[27] Both types increased the volume of white cake at most shortening levels and permitted the use of higher amounts of shortening for maximum cake volume; combination of both types of emulsifier produced more volume than could

be obtained with either emulsifier by itself. A cake mix has been marketed in America in a carton made of white board/aluminium foil laminate which is of such volume that it gives optimum results when the made-up mix is baked in it.[28]

Advances in basic science

Many interesting papers were published during 1954, of which only a selected number can be referred to here. It is hoped that the reader will forgive the omission of any paper which he feels to be significant.

Bread staling

Recent progress in studies in the important field of bread staling have been reviewed,[29] and a series of papers in *Cereal Chemistry*[30] is particularly worthy of mention. Flour was fractionated into starch, gluten, tailings and solubles, and bread baked from these fractions was indistinguishable from bread made from the original flour. Variations were tried in breads made from these flour fractions, and the results assessed by a sensory test panel. After equal storage periods bread of higher crumb moisture content was judged to be significantly fresher than bread of lower moisture content; the tailings fraction may be of importance in this connection as it has a higher moisture absorption than wheat starch and its presence in flour permits the use of more water in the dough and hence higher moisture content bread. Another finding was that as the protein content of the flour was increased the breads staled less rapidly; apparently changes in the starch cause the staling occurring early in bread storage while gluten affects the staling properties of bread after longer storage periods. The influence of fractions of different types of flour and of several starches upon the firming of bread crumb was also studied.

Studies of bread and dough

A new method of studying the microscopic structure of bread and dough has been described;[31] the results indicate that starch granules are separated from each other by the protein, which is the continuous phase. The granules show a pronounced distortion after baking, though they do not disintegrate. Bread crust colour has been studied, particularly, the part played by the "Browning" or Maillard reaction, by baking "loaves" containing different sugars and amino-acids.[32] The fate of sugars in bread doughs undergoing fermentation has been investigated; sucrose is hydrolysed very rapidly, glucose and fructose are fermented at a uniform, rapid rate, and maltose is fermented only slowly in the presence of glucose and fructose but rapidly after the latter sugars have been used up and the yeast has adapted itself to maltose.[33] The loss of bromate added as an oxidising agent to various types of dough has been found to be related to several factors, such as flour quality, yeast quantity and dough time.[34] The structural relaxation of unleavened doughs mixed in atmospheres of oxygen has been studied using the extensograph.[35] The relationship between dough consistency and proteolytic activity has also been investigated.[36] A system for studying the coupled oxidation of carotene by lipoxidase has been described, which may also be used for assaying this enzyme in soya bean and wheat products.[37]

Wheat and flour fractions

The examination of various wheat and flour fractions has been continued. The albumin and globulin (soluble protein) content of wheat flours of widely different type and baking quality were found to vary in proportion to total protein, and it appeared that the partial correlation of albumin-to-globulin ratio with protein quality had a high degree of significance.[38] A very interesting study of the distribution of the B-vitamins in wheat grain has revealed a remarkably high concentration of them in the aleurone layer, for which as yet no explanation can be proposed.[39] The significance of starch in bread crumb formation has been stressed, and it is claimed that its state determines the firmness and dryness in a complex exchange with the proteins, lipids, and other constituents of the crumb.[40] Attention has also been drawn to the effect of labile water on crumb properties.[17, 43] The determination of the degree of oxidation of flour lipids and reducing substances in the unsaponifiable fraction of the lipids has been discussed.[41] It appeared that the reducing value is the most sensitive index of the effect of gaseous flour improvers.

Microbiology

Of a number of papers in the microbiological field published during the last year, four are of particular interest. A comprehensive review has appeared of the methods of prevention of mould and rope in bread.[42] The extent to which *Bacillus subtilis* spores survive during the baking of bread has been the subject of careful investigation.[43] The addition of hydrogen peroxide immediately after pasteurisation has been suggested as a method for controlling infection spread by synthetic cream,[44] while the use of serine for a similar purpose has also been proposed.[45]

New Books

During 1954, two valuable books appeared. The first of these, "Bread," by Lord Horder, Sir Charles Dodds and T. Moran (Constable and Co., London) is a stimulating account of the chemistry and nutrition of flour and bread. The second is the fifth edition of Neumann's "Brot-Getreide und Brot" (Paul Parey, Berlin and Hamburg), which Prof. Pelshenke, the Director of the German Institute for Cereals Research, has completely revised and brought up to date. This will inevitably become a standard reference work and textbook, and is encyclopædic in its coverage of the subject. A serious defect in it, however, is the absence of systematic referencing, authors' names only being given, without dates.

Reference should be made to the

second Technologists' conference held by the British Cake and Biscuit Association. If anything, this was an even greater success than the first, and the value of such conferences can hardly be overestimated.

Finally, in the field of education of food technologists it may be mentioned that the courses at the National College of Food Technology have been successfully launched and the first students have completed their training. Industry is responding with increasing interest to the activities of the College, and is showing a growing desire to employ its students when they have completed the course.

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Microwave Irradiation of Orange Juice

A REPORT concerning the effect of microwave energy on the inactivation of pectin-methylesterase in orange juice concentrate has been presented by David A. Copson of the Research Division of the Raytheon Mfg. Co., U.S.A. (*Food Tech.*, 1954, **8**, 397).

Microwave irradiation of a fluid was found to offer certain advantages because of convenience in handling; the recovery of heat was also facilitated. The fluid in the experiments described was concentrated, thus reducing the volume of material to be irradiated. Movement of the fluid within the irradiated space had the effect of averaging out the energy transfer with respect to any specific portion of the fluid. As the fluid was of constant composition, the load presented to the microwave energy was constant, even though the load was actually flowing in the device.

The design of the apparatus is such that the product is heated quickly for inactivation of the enzyme and then cooled quickly to avoid side effects from the heat.

Using a new counter-flow system that utilised the microwave output of a magnetron with waveguide transmission to a helical antenna, it was found that the laboratory scale operation of the system was at a flow rate of 5·42 litres per hour. At this rate, the power utilised was sub-maximum for the magnetron used.

For industrial use, the cost per season for power for two lines was estimated at $21,600. In a typical plant operation producing 13,200 cans per hour per line, the cost of magnetron tubes for the two lines was estimated at $135,000 per season. The resulting cost for tubes, power, and capital equipment was 0·181 cent per 6 oz. can.

Material Handling in Works Stores

THE second edition of a book on the use of the fork-lift truck and pallet technique in modern stores systems* contains considerable information of value to the food industry. The first edition created great interest among material handling specialists and production engineers.

The book describes in plain, practical terms the results of introducing these techniques to one particular plant, tracing the progress of material from its reception in the raw state to its despatch in the form of finished goods.

This edition has been revised and enlarged to keep abreast of this rapidly developing subject. The many improvements and new procedures now being adopted in industry are explained in detail and their results carefully assessed. Sections covering the handling of bar material, fork-lift truck maintenance, training of drivers, and operating costs have been added, together with a number of new appendices containing useful reference material.

The book is profusely illustrated with photographs showing every stage of the stores system in operation, and representative types of fork-lift trucks for different duties.

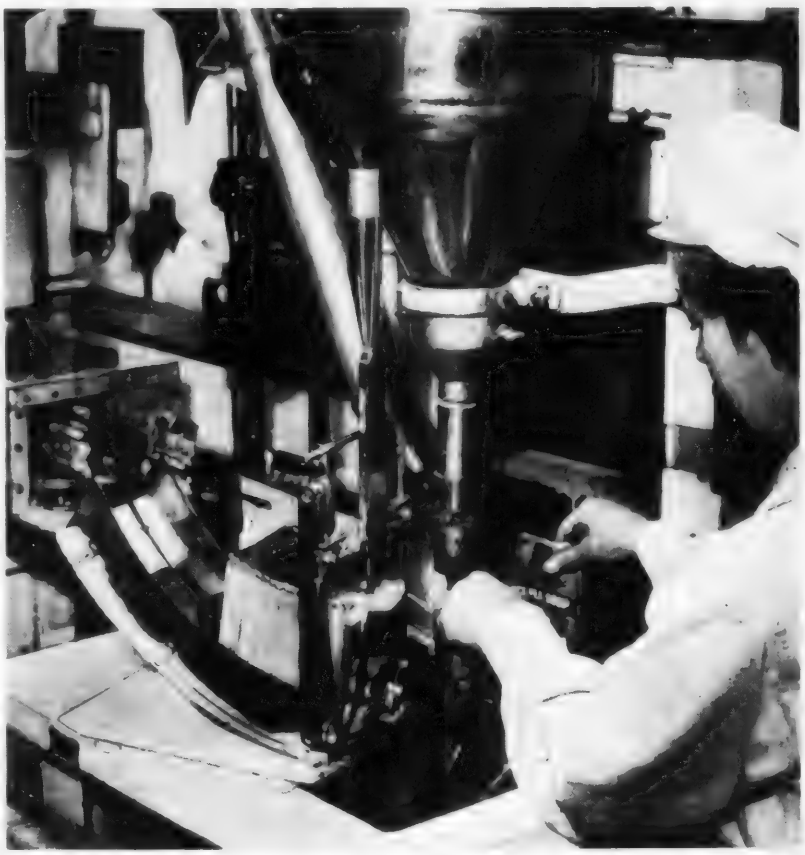
* *Material Handling in Works Stores: The Fork Truck and Pallet System.* By L. J. Hoefkens. 2nd edn. Pp. 196. Illustrated. Iliffe. 18s. net.

Packets Provide the Answer to the Pea Soup Prejudice

Pea soups have for a long time been unpopular in Britain, owing to the need for the housewife to soak the peas overnight before serving. In spite of this, a thick pea soup mix packed in a foil envelope was introduced last year, and has become so successful that it is now being produced in quantity for sale at home and abroad. It is derived from a traditional Dutch recipe.

FOIL PACKED soups were first produced in America, and became known in this country during the war through their inclusion in food parcels. Chicken noodle soup was the type that predominated, and it was this variety that was first manufactured in Britain—in 1950. Since then, other soups have been produced in this form, and the commodity is now well established. Foil packets possess the advantage that they can be made air-tight, and have considerable shelf appeal, owing to their large face area. They also take up very little shelf space, and are already packed in an attractive display box.

Batchelor's Peas, Ltd., has been closely concerned with the development of packet soup mixes, and the present production includes chicken noodle, mushroom and thick pea soup. Plans are being made to produce vegetable and onion soup mixes this year. Thick pea soup, which is the subject of this article, is made in Middlesex at Batchelor's Southall factory. Its other activities are canning foodstuffs and the packing of dried peas in cartons. The soup mix department is separate and is air-conditioned.



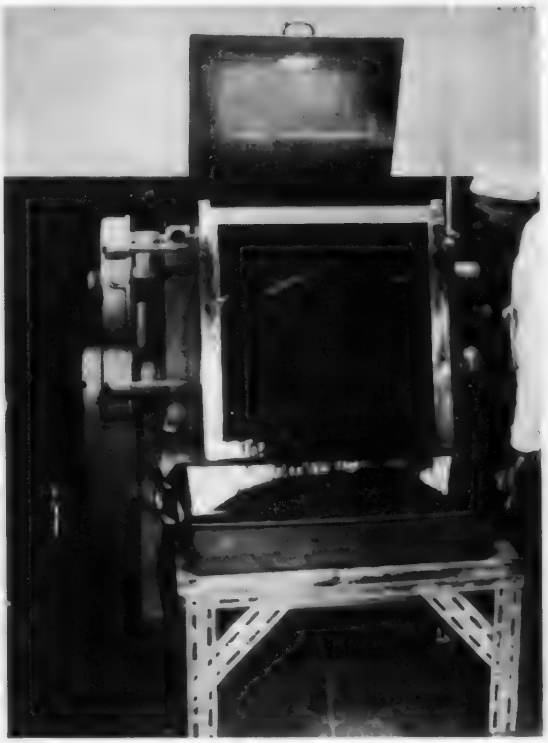
Filling is carried out by a volumetric filler providing a range of speeds up to about 30 packets/min. A compressed air jet opens packets supplied from a magazine.

Preparation of the ingredients

The thick pea soup mix contains peas, which have been precooked in a special way and dehydrated, leeks, celeriac and onion, and also flour, edible oil, salt, monosodium glutamate and flavouring. All the dehydrated vegetables are passed over inspection belts, sometimes more than once, to make sure no extraneous matter gets into the product. The peas are in a specially prepared dehydrated form which gives the soup its quality.

The cereal ingredient is passed through a vibratory sieve to separate any nodules, and the oil is pretreated in a manner which facilitates its subsequent blending into the dry constituents. The vegetables, etc., are weighed out into metal trays and transferred to one of the two mixers installed. After a short pre-mix, the oil is added and mixing continued. Each mixing weighs about 160 lb.—enough for over 800 3-oz. packets.

When this stage is complete, the contents of the mixer are tipped mechanically into two stainless steel trays with metal covers. Then, before a single packet is made up from any mix, a sample is taken to the Quality Control Department, and a plate of soup is made up, according to the instructions on the packet, and tasted. This is part of the production routine and is independent of any subsequent examination.



Left: **The cereal ingredients being passed through a vibratory sieve to separate any nodules.** *Right:* **After the ingredients have received a pre-mix, oil is added and mixing continued. The picture shows a mixer being emptied; each mixing weight, about 160lb., is enough for over 800 3-oz. packets.**

Packing

The foil envelopes measure approximately $4\frac{1}{2} \times 5\frac{1}{2}$ in., and are supplied printed in five colours and sealed along three sides. A jet of compressed air is used to open the packets as they are supplied from a magazine. The volumetric filler used provides a range of speeds up to about 30 packets a minute. It is set at $3\frac{1}{4}$ oz. to make sure that each packet receives at least 3 oz. of mix, enough to make 1 pint of soup. The filled envelopes proceed to heat-sealing rollers and then pass upright on a conveyor to a second operator who check-weighs packets taken at random. The packets are packed in dozens into display outers; two of these are finally placed into a fibreboard case. Sample packets are tested on the tightness of the heat-seal up to 25 in. of vacuum.

Total staff employed on this line is about 28; at maximum capacity, production on this line is nearly 4,000 packets an hour.

Frequent sample packets are taken to the quality control department and a plate of soup made up, according to the instructions on the packet, for tasting to ensure they conform to the quality standards.

SUPPLIERS

Flour sifter	.. Russell Constructions, Ltd.
Mixers ..	.. Robert Morton and Co., Ltd.
Stainless steel trays	.. A.P.V. Co., Ltd.
Fillers ..	.. Alite Machines, Ltd.
Packets	.. Brown, Bibby and Gregory, Ltd.
Air conditioning	J. and E. Hall, Ltd.

We wish to thank Colonel Maurice W. Batchelor, Chairman of Batchelor's Peas, Ltd., for permission to visit this factory and publish this article.

Selling British Consumer Goods in the U.S.

A guide to increased sales of British consumer goods to the U.S., "What American Stores are Buying in the British Market," has been published by the Dollar Exports Council. The wide range of British consumer goods marketed in the U.S. in 1954, including groceries and confectionery, is described, and the names are given of the resident buying houses in this country and of their American and Canadian clients.

Some 2,000 copies of the guide have been sent to America for distribution to members of the U.S. National Retail Dry Goods Association and copies will shortly be distributed by the Dollar Exports Council to trade associations and chambers of commerce in Britain.

★PROGRESS IN 1954★

THE VITAMINS – 1

By F. A. Robinson, M.Sc.Tech., LL.B., F.R.I.C.
(Allen and Hanburys Ltd., Ware, Herts.)

The outstanding event of the year in the vitamin field has been the synthesis by Todd and his colleagues of the coenzyme, flavin adenine dinucleotide, representing the culmination of many years of research into the phosphorylation of ribosides. Other publications of more than usual interest relate to the synthesis of various geometrical isomers of vitamin A and vitamin A aldehyde, and the identification of one of the latter, 2:4-cis-vitamin A aldehyde, with neo retinene b, the precursor of rhodopsin. A belated report on the testing of the new International Standard of vitamin D has been published by the World Health Organisation, whilst an account of a collaborative study of the microbiological assay of thiamine has appeared. The importance of pantothenic acid as a constituent of coenzyme A is being increasingly recognised, and it is now clear that this coenzyme occupies a central position in the metabolism of fatty acids and in the integration of fatty acid and carbohydrate metabolism. Once again, as in the last two or three years, vitamin B_{12} has occupied a leading position in current vitamin research, and although nothing new has appeared about its chemical constitution, considerable progress has been made in the elucidation of its biological action and the function and nature of the intrinsic factor.

Vitamin A isomers

SOME important papers have been published on vitamin A during the year. In the purely chemical field, the synthesis of several geometrical isomers of vitamin A and vitamin A aldehyde have been described,[1] including the synthesis of neoretinene *b* (2:4-*cis*-vitamin A aldehyde):

the precursor of rhodopsin. The following values have been reported[2] for the potencies of these geometrical isomers expressed as a percentage of the biological activity of all-*trans* vitamin A acetate; neovitamin A acetate (2-mono-*cis*-), 75; neovitamin A aldehyde, 91; 6-mono-*cis*-, 2:6-di-*cis*- and 2:4-di-*cis*-vitamin A acetate, 23; 6-mono-*cis*- and 2:6-di-*cis*-vitamin A aldehyde, 18; and 2:4-*cis*-vitamin A aldehyde, 47. In addition the synthesis of several polyene compounds with vitamin A activity has been reported[3] and two more compounds related to carotene have been shown to be active; synthetic *iso*cryptoxanthin (4-hydroxy-β-carotene)[4] is half and *cis*-β-carotene[5] one-quarter as active as *trans*-β-carotene. γ-Carotene has been synthesised.[6]

Natural forms of vitamin A

The so-called "sparing" action of lard on the utilisation of vitamin A, a phenomenon that has long puzzled investigators and which led to the belief that a vitamin A-like factor was present in lard, has now been shown by two independent groups of workers[7] to be due to the presence in lard of vitamin A itself. Bilirubin and biliverdin have been shown[8] to exert a stabilising action on vitamin A and are thought to be natural antioxidants. A stable powder containing vitamin A is claimed[9] to be produced by dispersing a crystalline form of vitamin A in an aqueous solution containing gelatine and sugar-like materials, suspending the aqueous dispersion in an oil and chilling to gel the beadlets thus formed; these are then dried. Feeding a water-miscible form of vitamin A to cattle increased the vitamin A content of the milk-fat, but did not have any effect on the vitamin A potency of the skim milk.[10] A new colorimetric method of estimating vitamin A and carotene has been described[11] based on the formation of a purple-red and bluish green colour respectively with perchloric acid in amyl acetate solution. Carotene is estimated by the absorption at 750 mμ and vitamin A by the absorption at 525 mμ after making a correction for the absorption at this wavelength of the carotene present. Vitamin A can be estimated in whale liver oils by adsorption on floridin earth that has been neutralised with ammonia.[12]

Chemical and biological estimation of vitamin D

The exact manner in which vitamin D prevents rickets is not yet known and little work appears to have been carried out on this problem in recent years. It has now been shown[13] that in the rachitic rat the epiphyseal cartilage has lost its capacity to oxidise pyruvate, although the glycolytic activity is unimpaired. This observation may well provide a new lead for future work.

The distribution of vitamin D following the oral administration of 1 mg. of calciferol was studied.[14] Muscle and skin together contained 20% of the body vitamin on the first day after administration and 40% on the second day. Small amounts were found in the kidneys and liver.

Attempts to find a satisfactory chemical method of estimating vitamin D have continued, and a method employing paper chromatography has been described.[15] With the aid of a two-stage chromatographic adsorption vitamin D can be separated from vitamin A and other interfering substances and then estimated spectrophotometrically.[16] Superfiltrol is used to remove vitamin A, carotenoids, pigments and some sterols, and activated alumina is then used to remove certain other polyenes and impurities. The method has been used successfully for estimating vitamin D in irradiated ergosterol in corn oil, crystalline vitamin D_2 and vitamin A acetate in corn oil, irradiated ergosterol and vitamin A palmitate in corn oil, and some fish oils. A modification of the spectrophotometric method has been described[17] in which the effect of absorption due to the oil in solution of Calciferol B.P. is eliminated by a graphical extrapolation procedure.

A report has just been published[18] by the World Health Organisation setting out the evidence on which the decision was taken in 1949 to replace by crystalline vitamin D_3 the solution of irradiated ergosterol adopted as the International Standard in 1931. Thirty-two laboratories in seven countries took part in the collaborative assays. These showed that vitamins D_2 and D_3 are equally potent for the rat, weight for weight, whilst vitamin D_3 as the International Standard has the advantage over vitamin D_2 that chicks can be used in the assay as well as rats; oils intended for poultry feeding must of course be assayed on chicks.

Antioxidant properties of vitamin E

Vitamin E has long been suspect as a therapeutic agent for the treatment of muscular dystrophy and of sterility in humans, but attempts to find a rational application for this substance have continued. It has now been claimed[19] that oral administration of α-tocopherol reduces the severity of the thromboses that develop in patients with thrombo-embolism. Whatever differences of opinion may exist as to its therapeutic value there are no doubts about its antioxidant properties, and it has now been reported[20] that α-tocopherol is an effective inhibitor of linoleic acid and oleic acid oxidations catalysed by hæmoglobin and cytochrome *c*. Vitamin A and carotene were co-oxidised during hæmin-catalysed oleic acid oxidation, and α-tocopherol inhibited this co-oxidation. Paper chromatography has been employed in a method of estimating individual tocopherols in wheat germ oil[21] and the well-known Emmerie and Engel test has been made more sensitive.[22]

Vitamin C

Further attempts have been made[23] to determine the route by which ascorbic acid is synthesised in plants and animals. As a result of work done during the year several substances have been excluded as possible precursors of vitamin C, and it has been shown that L-galactono-γ-lactone is converted into L-ascorbic acid by mitochondria from pea and mung-bean seeds. Some evidence has been obtained to indicate that aminopterin and sulphasuxidine inhibit the biosynthesis of ascorbic acid in the rat.[24]

Although it may have no connection with the normal role of ascorbic acid in the body, a new reaction of ascorbic acid has recently been demonstrated which has important biochemical implications.[25]

A mixture of ascorbic acid, ferrous salts and ethylene diamine-tetraacetate will, in presence of oxygen, bring about the hydroxylation of certain aromatic substances. Acetanilide for example is converted into N-acetyl-*p*-aminophenol, salicylic acid into gentisic acid and tyramine into hydroxy-tyramine. In guinea-pigs depleted of vitamin C, the hydroxylation of acetanilide and related compounds was markedly reduced, but was restored to normal by administration of ascorbic acid.

Thiamine, its analogues and derivatives

It has long been known that in the tissues of thiamine-deficient rats, the oxidation of pyruvate is depressed. It has now been shown[26] that the oxidation of α-ketoglutarate is not depressed to the same extent, an observation consistent with the view that fat in the diet alleviates the symptoms of thiamine deficiency; for the oxidation of fat, unlike that of carbohydrate, by-passes the oxidation of pyruvate. Analogues of thiamine continue to be used in an effort to throw still more light on the way in which thiamine functions, but antagonists of thiamine do not always simulate the effects of thiamine deficiency. Thus rats treated with neopyrithiamine do not show the same increase in R.Q. and energetic metabolism after glucose administration as do vitamin B_1-deficient rats.[27] The decarboxylation of pyruvate and the formation of acetylmethylcarbinol by wheat germ carboxylase were inhibited by oxythiamine diphosphate but not by oxythiamine or neopyrithiamine.[28] Feeding oxythiamine led to a decrease in the thiamine pyrophosphate content of the heart and breast muscle of the pigeon.[29] A new thiamine analogue, N-methylthiamine, has recently been prepared.[30]

To the list of phosphoric esters of thiamine must now be added another containing at least five phosphoric acid residues per molecule; it was made by the action of hydrolysed phosphorus oxychloride on thiamine.[31] Thiamine can be separated from its mono-, di- and triphosphates by means of paper chromatography, chromatography on starch, ion-exchange chromatography and paper electrophoresis.[32] Paper chromatography was used to study the interconversion of the four substances by kidney particles, whilst some of the other methods were successfully used for preparative purposes.

Radio-active thiamine has been employed to study the metabolism of thiamine. Using thiamine-S,[35] urinary excretion was confirmed to be the chief mode of elimination in the rat, and fæcal excretion

shown to be relatively unimportant. Storage of some of the labelled sulphur was demonstrated in all the tissues analysed.[33] Using thiamine containing C^{14}, some of the labelled carbon was subsequently found in the respiratory carbon dioxide, whilst 16 different urinary metabolites were detected, of which thiamine was the chief.[34]

An important report on the microbiological assay of thiamine has been published[35] recommending as equally useful a cup-plate method and a tube method, both employing *Lactobacillus fermenti* 36 as test organism.

Synthesis of flavin adenine dinucleotide

The synthesis of the coenzyme, flavin adenine dinucleotide, is described in one of the most outstanding papers of the year.[36]

A level of 1·25 mg. of riboflavin per lb. of feed is required by the pig for gestation and lactation.[37] Clear-cut deficiencies of riboflavin, as well as of choline and pyridoxine, have been produced for the first time in guinea-pigs.[38] Riboflavin has been identified as the skin-pigment of two species of green snakes.[39]

A great deal of work has been reported on the biosynthesis of riboflavin by various micro-organisms. It appears that amino acids provide the carbon units in the aromatic rings of riboflavin synthesised by *Eremothecium ashbyii*, and purines the remainder of the *iso*alloxazine structure.[40] Purines also increased riboflavin synthesis by a mutant strain of *Saccharomyces cerevisiæ*.[41] Radioactive riboflavin was synthesised by growing both *Ashbya gossypii*[42] and *Lactobacillus casei*[43] on media to which had been added formate, acetate or bicarbonate containing C^{14}. The position of the radioactive carbon in the riboflavin molecule depended on the nature of the precursor.

Evidence is accumulating that the ability of riboflavin to form chelates with certain metals[44] may be of considerable biological importance. Thus xanthine oxidase and aldehyde oxidase appear to be molybdoflavoproteins, whilst diphosphopyridine nucleotide cytochrome *c* reductase appears to be a ferroflavoprotein.[45] In the presence of certain metal-chelating agents riboflavin is reversibly reduced by visible light, whilst certain metal ions inhibit this photoreduction.[46]

Nicotinic acid

An improvement in the manufacture of nicotinic acid has been described,[47] in which crude nicotinic acid is purified by azeotropic distillation with tetrahydronaphthalene, diphenyl or diphenyl ether. Most of the other papers on nicotinic acid have been concerned with its metabolism. A method of estimating the main metabolites of nicotinic acid has been described[48] based on conversion of the amide group to an amine group by treatment with hypobromite, followed by diazotisation and coupling with N-(1-naphthyl)-ethylene diamine. Normal humans on diets low in nicotinamide and tryptophan excreted 3 mg. of N^1-methylnicotinamide and 5 mg. of N-methyl-6-pyridone-3-carbonamide.[49] After a 50 mg. test dose of nicotinamide the excretion of the pyridone increased fivefold. The metabolism of nicotinic acid in insects differs very markedly from that of mammals, no methylation apparently taking place.[50]

Pyridoxine deficiency

It has been reported[51] that pyridoxine deficiency in babies produces convulsive seizures. Rats deprived of vitamin B_6 contained markedly less carcass fat than normal rats;[52] disturbances in nitrogen metabolism are probably secondary to a primary effect on energy production which deprives the animal of surplus food for storage as fat. Other symptoms of chronic vitamin B_6 deficiency in the rat include an increase in systolic blood pressure, and an increase in the wet weight of the adrenals, ventricular mass, liver and kidneys.[53] The mode of action of pyridoxal has continued to be the subject of investigation. In the presence of pyridoxal and a catalytic metal ion, threonine and allothreonine are converted into acetaldehyde and glycine and, to a lesser extent, into α-ketobutyric acid and ammonia.[54] Serine undergoes similar reactions. Pyridoxamine undergoes rapid transamination with glyoxylic acid, yielding pyridoxal and glycine. Many α-amino acids transaminate directly with glyoxylate and the reactions are catalysed by aluminium, iron and copper salts. These reactions are similar to those catalysed by pyridoxal phosphate enzymes. The intermediate compounds formed by interaction of pyridoxal and α-amino acids are stabilised by chelation with the metal ion. 4-Nitrosalicylaldehyde behaves like pyridoxal in taking part in metal-ion catalysed transamination reactions.[55]

In the concluding part of this review the following subjects will be dealt with: pantothenic acid and coenzyme A, folic acid, vitamin B_{12}, and thioctic acid.

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Pineapple Juice Canning

By P. E. Seale, Dip. Ind. Chem.

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Pineapple juice, with an annual production of over 28 million gal., ranks second in world production of canned fruit juices. Over 90% of the pack is canned in Hawaii, with the Australian production of 1,750,000 gal. fading into relative insignificance. The smooth-leaf Cayenne variety of pineapple, thought to have been originally a native of South America, and subsequently imported into Hawaii from Queensland plantations, is almost exclusively used for canning purposes. Sixty per cent. of the pineapple is available for processing: 40% being packed in the form of slices, chunks, segments, diced and crushed, and the other 20% being recovered as juice.

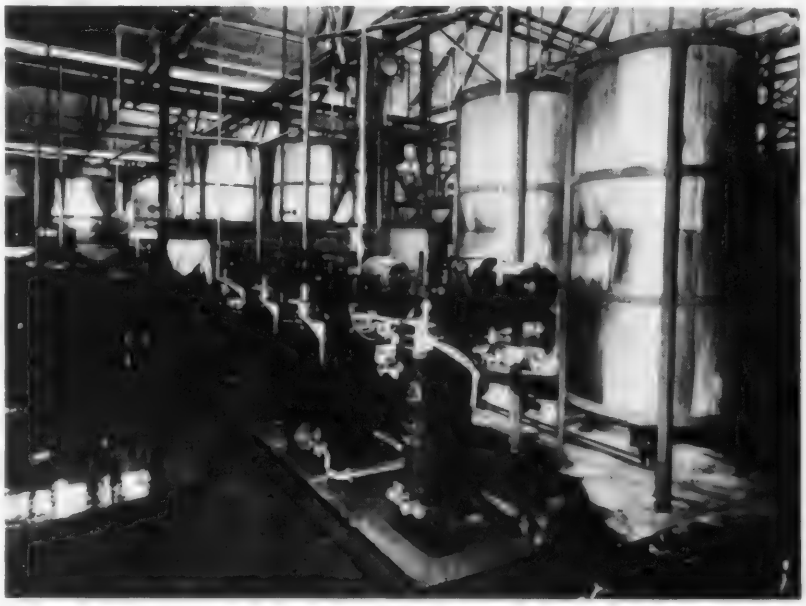
Composition

PINEAPPLE juice consists essentially of water, sugars, acids and small quantities of colouring and flavouring matters and mineral substances. As the natural sugar and acid ratio falls within the range 12-15 to 1, the pineapple is considered sufficiently palatable to be eaten direct. Over a series of maturities, from green to ripe, the total sugars may vary from 8 to 18%, while the *p*H may vary from 3·3 to 4·1. These characteristics may also be affected by location and particularly by climate. Sucrose is present in approximately twice the quantity of reducing sugars, and acids are chiefly citric and to a lesser extent malic.

Colour is reported to be due chiefly to carotene with smaller quantities of xanthophyll present.

Ascorbic acid is present at a concentration of 12-14 mg./100 c.c. in the canned product, but the concentration in the fresh fruit varies throughout being high in the core (about 18 mg.%), lower in the flesh (about 16 mg.%), and highest in the skin (about 24 mg. %).

At least two enzymes appear to be present. Bromelin has intense proteolytic activity, and rubber gloves are essential for the protection of persons handling the cut fruit. This enzyme is destroyed by heating to 167°F. and holding for a few seconds. There is also evidence of a pectin-destroying enzyme, possibly either pectase or pectinase, which is most active at 120°-140°F., and is inactivated during pasteurisation.



Pineapple juice processing plant of Queensland Tropical Fruit Products, Brisbane. The photograph shows (left) a feed tank where extracted juice is received after being heated to 140°F in a tubular juice heater (shown behind centrifuges). Juice then feeds over vibrating screens (left) to remove coarse solids and is finally clarified in the Super Sharples centrifuges in the foreground. Batches of juice are blended in the tanks on the right and are then pasteurised in the vertical multi-tube pasteuriser visible in the centre background.

A small quantity of protein is present and appears to be of three distinct types. Two types are coagulable by heat as can be demonstrated by heating filtered juice. Turbidity begins at 140°F. and increases up to 170°F. If this juice is filtered clear and the heating continued, further turbidity starts at 180°F. and increases up to boiling point. The third protein is non-coagulable by heat, but is precipitated by acetic acid and potassium ferrocyanide.

The flavouring constituents appear to be associated with the colloidal materials in the juice, and any attempt at filtration removes them almost entirely. Flavours appear to be present in greater concentrations in summer pineapples than in the winter crop.

Preparation and processing

The commercial processing of pineapple juice must be considered as an integral part of pineapple canning, and a brief survey of canning procedure is necessary to give the proper perspective to the methods employed in juice production.

Pineapples are picked to an external colour standard which is varied to provide canning fruit at the desired maturity. The fruit is picked "eating ripe," graded for size in the field, and transported in lug boxes to the factory.

After quality inspection, the graded fruit is fed to the Ginaca machine, which consists of four basic parts: a *power conveyor* with a centring head to locate the fruit in relation to the cutting knife; a *circular rotary knife* for removing the skin from the flesh, the cylinder of peeled fruit then passing into a *turret* where the top and bottom are cut off; and a *coring tube*. The fruit is forced against the cylindrical rotating knife by the pegs of the conveyor, and shell-splitting knives on the outside divide the skin into two equal parts. The diameter of the sizing knife is governed by the size of the container (No. $2\frac{1}{2}$, No. 2 or No. 1 tall can) which receives the slices. Because of the shape and variations in the diameter of the pineapples, there is a considerable amount of good quality flesh adhering to the shell. The shells, after being split in the peeling operation, feed to an "eradicator" generally built as an integral part of the Ginaca machine. The eradicator is normally adjusted to remove the flesh up to the innermost extremity of the "eyes" in the pineapple skin. A further cut may be made in a second stage eradication, to remove most of the remaining flesh. The first eradications are inspected and any skin or specks removed, the juice is drained off and the flesh is converted into crushed pineapple. The second eradications are a source of juice and will be discussed at a later stage.

The peeled fruit passes into a turret, where top and bottom are sliced off and the core is removed. The cylinder of fruit then passes to the trimming lines where any remaining skin is removed by hand and the fruit is sliced or segmented and packed into cans. Portions of broken slices, which are less than one-third of a full circle, are either diced or crushed to a fine pulp. In either case, a fair amount of juice is liberated, and this is removed by vibrating screens or rotary reels.

There are several possible sources of pineapple juice:

(1) Cores;
(2) Drainings from crushed and diced pineapple;
(3) The flesh adhering to the skin after the first eradication.

The extraction of juice from the cores is carried out by reducing in a type of hammer mill, followed by pressing in a continuous expeller.

Treatment of skins following the first eradication is of considerable interest, as the handling method at this stage governs the later processing methods. Two distinctly different types of juice may be prepared. One type is high in suspended pulp, generally 15% to 18%. This procedure involves extraction from second eradications, cores and drainings, and is the method used in Hawaii.

The second type, as produced in Queensland, is prepared by a controlled pressing of the skin after the first eradication and combining the juice with that recovered from cores and drainings. Juice prepared by this procedure normally has the sediment reduced to less than 1%, since the sediment includes constituents from the skin which are undesirable in the final product.

General practice in Hawaii is to pass the skins through a second stage eradicator, and disintegrate the flesh in a Schwarz press. The pulp is then expressed in a Zenith-type screw press, fitted with pneumatically controlled outlet choke, set for maximum recovery. Juice is mixed with silica and partially filtered in a suction filter; sediment is controlled within the desired limits by feeding to continuous-discharge centrifuges (Merco or Sharples DV2) suitably adjusted.

The alternative Queensland procedure is to pass the skins through a type of hammer mill, followed by expression in a screw expeller. Adjustment of the pressure applied is important, as excessive squeezing results in undesirable flavours being extracted. The juice is then preheated to 140°-150°F. to reduce the viscosity and passed over 60 mesh vibrating screens, which reduce the sediment from 18% to 6%, followed by centrifuging either batch-wise in Super-Sharples or continuously in a Sharples DV2 adjusted to give clarification to less than 1% sediment. Following this step the juice is blended, and if necessary the Brix is adjusted to approximately 14°, and then pumped through a shell and tube pasteuriser which elevates the temperature to 185°F. It is filled hot (170°F.), closed using steam-flow, and the cans are circulated in air, for a short period, to allow sterilisation of the container, and then passed under water sprays on a spin cooler where the temperature is rapidly reduced to 110°F.

By-products

The commercial demand for pineapple juice naturally governs the quantity produced, and as a result uses have been developed for juice available in excess of canning requirements and also for juice extracted by maximum expression of the skins. Pineapple vinegar is manufactured in Hawaii to a limited extent.

The majority of the available juice is treated and subsequently used in the syrups added in canning. The basic process involves expression of the juice, followed by vacuum filtration to remove suspended matter, neutralisation with lime and reclamation of the acids from the calcium salt, concentration *in vacuo* from 10° Brix to approximately 40° Brix and clarification with either activated carbon or by use of ion exchange resins.

Low-temperature concentrate

Hawaiian Pineapple Co. have developed a suitable process following the general lines of orange juice concentration. Notable points are:

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HERRING – The Pork of the Sea

By C. L. Cutting, B.Sc., Ph.D., F.R.I.C.

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Through the centuries the humble herring has been the basis of great commercial empires — notably the Hanseatic League and the Dutch Grand Fishery. Great Yarmouth became famous and prosperous because of its red herrings and later Scotland became the greatest herring curing nation in the world. Against this background the author describes the development of herring curing methods up to the present day. The article is based upon material in his book "Fish Saving — A History of Fish Preservation from Ancient to Modern Times" which is to be published shortly by Leonard Hill Limited, 9 Eden Street, London, N.W.1 (pp. approx. 350, illustrated, 42s. net.).

THE characteristic features of the pelagic species of fish, chiefly the herring, with its relations the pilchard and sprat, and the mackerel family, including the tunny, as compared with the white fishes, are that they are surface shoaling, migratory and seasonal in occurrence and extremely fatty. Salt cod became known in Elizabethan times as "the beef of the sea," and salt pickled herring would perhaps have had an equal right on account of its fattiness to be called "the pork of the sea" had not this comparison been reserved for the porpoise (*i.e.* "porc-poisson" or pigfish). Access of atmospheric oxygen soon results in the oxidation of the relatively unsaturated body oil of these fatty species, and the characteristic methods developed to "save" (or preserve) the enormous sea harvests available during fairly regular but relatively short seasons were salting with brine in tight barrels, or smoking. The former process, which was used in Ancient Egypt for preserving mackerel, hinders the access of oxygen to the fish, and smoking also lessens oxidation of the fat by reason of the absorption of phenolic bodies (with anti-oxidant properties) produced during the combustion of wood. Although herrings were also sun and wind dried without salt, and still are in Iceland for example, such products must soon have become objectionably rancid in flavour and were therefore articles of local consumption only. Only heavy salting and smoking resulted in products which were stable enough to be traded safely by the slow-moving sailing ships of the pre-steam era.

Primitive preserving methods

Herrings, presumably salted to preserve them in some crude manner, appear in inland monastery account books in Anglo-Saxon times, and Norwegian sagas of the end of the tenth century also refer to herrings. It has even been suggested that the year-to-year fluctuations in availability which occur from time to time in these species may have been responsible for the migrations of the Vikings, who were poor agriculturalists and lived chiefly on a fish diet. By the twelfth century, the English, notably at Yarmouth, as well as the Scots, French and Netherlanders were all fishing for and preserving herrings, but the first really concentrated fishery was at the Western end of the Baltic at Scania (or Schonen) on the extreme South-west tip of Sweden, then under Danish suzerainity. The trade in the product became monopolised by German merchants from towns in the Hanseatic League, which in fact owed a great deal of its prominence to the herring. The Danes did the actual fishing in small boats carrying three to six men, and even the Netherlanders favoured herrings from this area, while the English were importers of the product. Each great Hanse town, Lübeck, Danzig, Stettin, etc., had its own area marked out on the Scania peninsula. Kolberg's, for example, measured 480 yards by about 100 yards. Here the merchants camped, salted and packed the herrings and transacted their business during the season.

Improved methods

Methods of salting herrings up to the twelfth century probably consisted merely of strewing salt over heaps of ungutted herrings and transporting over relatively short distances in wicker-work baskets. The fishermen on the Zierikzee, on the East Schelde, are credited with first packing herrings in barrels at sea, and those of Biervliet, on the West Schelde in the southern part of Zeeland near Flushing, are said to have been the first to clean the insides of the fish before salting in order to preserve them better. A Yarmouth man, too, seems to have made certain improvements about 1220 which were put into practice under licence in the Cornish fishing. It was for long believed and has been repeatedly stated that a Dutchman by the name of William Beukels (or Beuzelzoon) —some even claim that he was really an Englishman by name Belkinson—whose dates are rather uncertain, although he probably died in 1397, revolutionised the technique of salting herrings by a number of important innovations. It is now becoming accepted that numerous unknown men must, by slight improvements, perhaps over a relatively short period, have brought about this radical improvement in practice, and that in any case the cradle of the revolution was more likely to have been on the shores of the Baltic, at Scania. What Beukels probably did—and the latest research confirms that a man of that name

existed about that time—was to apply the improved Hanseatic methods to conditions in the North Sea sometime about the end of the fourteenth or the beginning of the fifteenth century. This coincided with a period when, for natural reasons, the herrings forsook the Baltic, thus undermining the source of Hanseatic strength, although herrings continued to be cured on the Baltic for long afterwards.

The essential feature of the improved process was a rigid specification backed by strict supervision to ensure a properly prepared commodity. After the fish were brought ashore at Scania, they were eviscerated, by women, washed in sea-water, "roused" (*i.e.* turned over and over) in salt, and finally packed with salt in barrels. The barrel, when full, was allowed to stand for 10 days, after which the herrings had sunk a little as a result of shrinkage due to osmosis, so the barrel was then re-opened and filled. Hanseatic laws forbade the placing of small or inferior fish in the middle of the barrel and the fish had all to be salted alike and packed in regular layers. "Full" herring, containing fully developed roe or milt, were distinguished from "Spents," *i.e.* those which had just spawned. At first the fish were exported in the barrels in which they had originally been packed, but later on the majority were sent to the Hanseatic towns to be sorted and repacked in specially stamped barrels. In 1375, at a Conference at Lübeck, the "Rostocker Band" was adopted as the standard measure.

The Grand Fishery

With the decline of the Baltic fishing it was the Dutch who forged ahead so that for several centuries they practically monopolised the international trade in pickled herrings, although they were caught under the very eyes of the Scots and English off the Shetland Islands and North-east Scotland in the summer and East Anglia in the autumn, just as they are today. In order to do this effectively from Holland, it was essential to salt the fish at sea, and a large, seaworthy, decked vessel, known as a "buss," was evolved to carry a crew of 15 men, including skilled picklers and coopers, together with the nets, salt and barrels required for the season's work, which resulted normally in a production of about 35 to 40 lasts (a "last" comprising 12 barrels, totalling about 2 tons). At the peak of this industry, in the first half of the seventeenth century, there were probably over 2,000 of these busses employed, Enkhuizen alone having 700 in 1637. Nearly half-a-million persons were employed directly or indirectly, or one-fifth of the total population of the country, and not for nothing was it said, figuratively, that Amsterdam was "built on herring bones." As one Dutch writer somewhat Calvinistically expresses it in 1639: "The Dutch catch more herrings, and prepare them better than any other nation ever will, and the Lord has, through the instrument of the herring, made Holland an exchange and staple market for the whole of Europe."

The Dutch process

Although an attempt seems to have been made to keep the practical details of the Dutch process a closely guarded secret, it can be seen from their published ordinances that the real secret of the predominance of this Grand Fishery was once again in stringent regulations regarding standards of quality, with severe penalties for backsliders when caught, *e.g.* a month on bread and water (1651). Systematic legislation was inaugurated by a Law promulgated in 1519 by the Holy Roman Emperor, Charles V. The Dutch republic consolidated the regulations and in 1620 the College of Fisheries was invested with full powers to make regulations and settle disputes. This College met annually at Delft at the beginning of each season to decide on the date for the commencement of the fishing (which was related to the "quality," and in particular probably the fattiness of the fish), to issue instructions and grant licences.

The sequence of operations, which is exactly the same as is still used to this day, and which, as can be seen, owes much to its Baltic forbears, was as follows. Immediately after the herring had been shaken out of the drift net on to the deck of the ship they were "gipped," by removing the gills and some of the viscera, including the "long gut," or alimentary canal, through an incision in the throat; they were then sprinkled with salt and "roused," sorted and packed regularly head to tail in barrels with salt sprinkled between the layers, which were arranged alternately across one another. Finally, the barrels were topped up and made airtight (to minimise oxidative rancidity) and branded with the date of catch. The barrel of Brielle, in the North-west corner of the island of Voorn was adopted as the standard. All herrings had to be taken back to Holland for branding and could not be sold at sea or shipped directly to foreign markets. First caught herrings could not be sold until they had been in pickle for at least 10 days. Repacking on shore had to be completed within three weeks of landing. The number and size of staves for making barrels were specified, and not more than three pieces of wood were allowed in the bottom of the barrel. Only dry, heavy wood could be used, and all faulty barrels were broken up. The use of old barrels was strictly prohibited. Any fault in packing which could have resulted in the brine leaking out would have let in air and been fatal to the keeping quality and reputation of the product.

The packing of poor quality herring, together with good herring, was severely forbidden, but the former could be packed separately if correctly labelled, *e.g.* (to use current terms) "overdays" (*i.e.* caught the previous day), or "mazy" (so close to spawning that the roes and milt are squeezed out all over the fish on capture). No one, according to a Placart and Ordinance of 1651, should lay the herrings crosswise, or falsify or change them, put the old under new, lay those bitten by sharks (dogfish presumably), or that were sickly, by the good, nor those

which were caught on the one night by those of another taking. No herrings could be "heightened" by fresh pickle nor repacked but in the public street, on the quays or in "such places as are customary with open doors."

The British red herring

More than anything else the Dutch pickled herring was the cheap, mass-produced food of pre-industrial Europe. However, in spite of the superiority of the Dutch cure, production continued in this country, although the Yarmouth cure only fetched £10 per last when the former sold for £25. The characteristic product which Britain developed, and in which Yarmouth was pre-eminent, was the "red" herring (the pickled herrings just described were also known as "white" herrings), obtained by salting ungutted herrings, and then subjecting them to a lengthy and thorough smoking process in which further dehydration also occurs, with the result that the product was more dark brown than red, as hard as a board and saturated with salt. In fact, "black" herrings was another name for them, and "black houses" for smoking them are mentioned in an English will of 1349, although herrings were being preserved by smoking in England and France for at least a century before this.

The Statute of Herrings in 1357, fixed the maximum wholesale price and profit margins for the sale of white and red herrings at Yarmouth in an endeavour to prevent profiteering in one of the townsman's basic foods. The price of herrings to be cured as "reds" was not to be above 40s. per last, *i.e.* about 20 for a penny, at the port. The fish were to be sold within 40 days for half a mark (*i.e.* 6s. 8d.) of gain, and the fishmongers of London were not to sell them for more than one mark extra. Two lasts of "shotten" (spawned) red herrings were to be sold one mark dearer than a last of full red herrings "because the curage of the two lasts of shotten herrings draweth to as much as the last of full herrings."

Thomas Nashe, author of the immortal "Summer's Last Will and Testament" ("Spring, the sweet spring," etc.) and one of the more ebullient Elizabethans, was born at Lowestoft. He published in 1599 a curious "bread and butter" work entitled "Lenten Stuffe; containing the description and first procreation and increase of the towne of Great Yarmouth, in Norfolke; with a new play never played before of the *Praise of the Red-Herring*." He dilates upon "the puissant red herring, the golden Hesperides red herring, the Meonian red herring, the red herring of Red herrings. . . . St. Denis for France, St. Iames for Spaine, St. Patrike for Ireland, St. George for England and the red herring for Yarmouth." "A red herring is wholesome in a frosty morning: it is most precious merchandise because it can be carried through all Europe. Nowhere are they so well cured as at Yarmouth. The poorer sort make it three parts of their sustenance. . . . A red herring drawn on the ground will lead hounds a false scent."

According to Nashe, however, "reds" did not keep as well as salt herrings, presumably because submersion in brine presented a physical barrier to oxygen which was more efficient than the chemical barrier provided by antioxidants absorbed from the wood smoke.

He patriotically compares East Anglian herring with "the fat, restive Scottish herrings, which will endure no salt, and in one month (bestow what cost on them you will) wax rammish [rancid?] if they be kept, whereas our embarreled white herrings, flourishing with the stately brand of Yarmouth upon them last in long voyage better than the red herring."

Two reasons given (in 1670) for the Dutch not capturing our trade in "reds" as they had that of salted herrings were that the fish must be brought fresh to the land to be cured, as at Yarmouth, which the Dutch could not do; and they must be smoked with wood, whereas Holland was not a woody country. Nevertheless, herrings caught by the Dutch off the coast at Yarmouth on the last night or two of the season were not "gipped," but were salted slightly for making into "reds" when they got back to Holland. In addition, the Dutch operated quite a considerable industry for smoking herring, although it was quite separate from their Grand Fishery. For this they used chiefly their flat-bottomed "pinken" or "bomschuiten" (bum boats). Herrings caught by these vessels off Yarmouth were strewn with salt (or "steuren," hence "steurharing") on board and carried home in baskets (or "Korven," hence "Korfharing") to be smoked in the coast villages and sold as "bokking" mostly for home consumption. Similarly, herrings caught in the Zuider Zee, which were small and often lean ("yele haring") were not salt cured, but were either sold fresh, as "pan herring," or more often smoked. These "bokking," which never fetched anything like the price of cured herring, appear to have been either cold smoked, like reds, or else hot smoked and cooked in a fashion similar to the process used for the present-day German "Bückling," which is itself probably a lineal descendant of some earlier, more durable product, comparable with the red, made on the shores of the Baltic in Hanseatic times. A writer in 1669 describes how "corved herrings" taken about Yarmouth were used for "redding." He says that these fish must "be taken on shore two or three days after they be taken, otherwise they must be pickled." "For the making of the pickle, the observation is that it must be so strong as that a herring will swim in it, and then it doth so pine and overcome the nature of the herring, that it makes it stiffe and preserves it, otherwise if the pickle be weaker than the nature of the herring it will overcome the strength of the pickle, and so the herring will decay." This is a fairly good account, for the age, of the osmotic changes occurring during the salting of fish. Much the same type of metaphor can still be heard in the fishing industry at the present day.

Daniel Defoe, writing in 1724, reports of Yar-

mouth that he has "heard the merchants themselves say (*viz.*): That they have cur'd, that is to say, Hang'd and dry'd in the smoak 40,000 barrels of merchantable red herrings in one season," each barrel containing about a thousand herrings (*i.e.* a total of about 7,000 tons). The Scottish herrings have always been regarded as less amenable to "redding," witness Defoe, speaking of Dunbar, at the same time. "They have here a great Herring-Fishery, and particularly they bring herrings here, as they do at Yarmouth in Norfolk, for the smoking them: . . . I cannot say they are cur'd so well as at Yarmouth, that is to say, not for keeping and sending on long voyages, as to Venice and Leghorn, though with a quick passage, they might hold it there too. . . . The Herrings also themselves may a little make the Difference, because they are generally larger and fatter than those at Yarmouth, which makes it more difficult to cure them, so as to keep in a hot country and on a long voyage."

The market for British "reds"

On the whole, the output and market for British "reds" during the last century seem to have been relatively stable, compared with those for salt herrings, for example. In 1853, about 10,000 lasts (20,000 tons) were produced, and in 1913 the figure was not much different, although by then constituting only 6% of the total catch. In 1953 production amounted to 12,000 tons. The methods used, too, have changed very little even to this day.

Successive British Governments, from Elizabethan times onwards through the seventeenth and eighteenth centuries, cast envious eyes on the success of the Dutch, and made various efforts to encourage the fisheries for both "whyte and grey fishes," *i.e.*, chiefly, cod and herrings. It was the naval prowess of Blake during the Commonwealth that applied the first severe check to the Dutch Grand Fishery, and in 1653 the whole herring fleet, amounting to some 2,000 sail was kept at home. For the next 60 years, until the Peace of Utrecht in 1713, Holland was at war either with England or France or both, and in addition Dunkirk privateers took a heavy toll. In 1702 the War of the Spanish Succession broke out, and in that year four French men-of-war defeated an armed convoy and burnt 400 vessels of the Dutch fleet in Bressay Sound in the Shetland Islands. The quality of their product also began to fall away, and by the end of the seventeenth century complaints became regular.

Despite persistent government-aided attempts throughout the eighteenth century to establish a British herring fishery round our coasts, by systems of subsidies (called "bounties") it was not until after the Napoleonic wars that Scotland was finally set on the road to become within a century, first through the agency of the sailing drifter and aided just before 1900 by the change over to the steam drifter, the greatest herring curing nation in the world. This prosperity was based largely on the export of the traditional pickled herring, salted on shore, to Eastern Europe, which in 1913 accounted for about 300,000 of our total catch of 550,000 tons, and when this trade collapsed, largely as a result of two world wars, the herring industry declined to less than a half of its former production. However, it is still true to say that, although other nations may catch more, we eat more of our own herrings than any other nation on the Atlantic seaboard, mostly in the "fresh" (iced) or "kippered" (lightly smoked) state, whilst a small but increasing proportion is now being preserved for longer term storage by means of freezing.

Herring and similar related species throughout the world are today mostly caught for extraction of their oil and conversion of the residue into animal feeding meal. Norway utilises thus four-fifths of her annual production of about 1 million tons, and with the continued decline in the home consumption of fresh herrings and kippers the proportion in Britain reached 45% in 1953.

This paper was prepared as part of the programme of the Food Investigation Organisation, D.S.I.R.—Crown copyright reserved.

Colour in Foods

THE importance of colour as an indication of the quality of foods, particularly fruit and vegetables, led to the sponsoring by the Quartermaster Food and Container Institute for the U.S. Armed Forces, of a symposium on the subject which was held at the University of Chicago in November 1953. The papers read at this meeting, together with the discussions they provoked, have now been published as a book*, copies of which are being distributed free to those who are conducting research in this field.

There are four main sections in the book: colour and its relationship to food investigations, colour measurement in relation to commodities and consumer interest, instruments for the study of colour, and measurement of colour and colour differences in relation to quality. Fourteen papers are included in these sections, the contributors being scientists from the universities, industry and government research bodies. Two papers were contributed by British authors, namely G. J. Chamberlin of The Tintometer Ltd., who discussed colorimetry and foodstuffs in Britain, and Alan Joyce, Ministry of Food, who spoke on the effect of heat treatment on some plant carotenoids.

The symposium provided an excellent forum for the presentation and discussion of a great variety of views on the subject of colour in foods, and the publication of this book will be welcomed by all concerned with colour problems.

* *Colour in Foods*. Published by the National Academy of Sciences—National Research Council, Washington, 1954. Copies available from the Quartermaster Food and Container Institute for the Armed Forces, 1819, West Pershing Road, Chicago 9, Ill., U.S.A.

Advances in Food Technology

COCOA BEANS

Flavour Studies

The influence of moisture and heat treatment on the flavour characteristics of cocoa beans has been studied. By controlling the process by chemical analysis, it is possible to obtain any desired flavour characteristics as well as to improve and rationalise the fermentation of raw cocoa.—A. Bäucker, *Fette, Seifen, Anstrichmittel*, 1954, **56**, 815.

OLIVE OIL

Enzyme Extraction

Since Spain has over 14,000 oil mills, any improvement in the extraction process of olive oil is of great economic importance. Even the most modern hydraulic equipment is still expensive to operate owing to its rapid wear, and any means of relieving the task of the presses would be welcome. According to research carried out at the Spanish National Institute for Agronomy during the last few years, the extraction of olive oil can be facilitated by the addition of an enzyme which, after a more or less prolonged contact with the crushed fruits, modifies the constitution of the adhesive agents in the oil so that it becomes easier to segregate the oil from the water and the solid particles of the fruits. It was found that ease of extraction is closely related to the pectin contents of the fruits and that by adding pectinases the biochemical processes facilitating disintegration are encouraged, with the result that oil can be extracted at a much reduced pressure. Research on the subject is to be continued in three directions: more knowledge is desired concerning the natural composition of the fruits; the effect of specified quantities of different enzyme additions on the composition of the fruits; and the optimum conditions of timing and extraction pressure.—J. M. de Soroa y Pineda, *Oléagineux*, Dec., 1954.

PECTIN

New Pectinometer

At the Institute for Industrial Research, Zagreb (Jugoslavia), a new pectinometer has been developed which measures the differential pressure required to break a 1 cm. layer of a standard pectin gel. The standard strength thus defined is equivalent to a pressure of 50 cm. water column. The device can be used for simple methods of standardising, testing and mixing pectin preparations.—D. Sulc, *Fette, Seifen, Anstrichmittel*, 1954, **56**, 820.

MILK

Effect of Aluminium and Tin Containers

With the increasing use of aluminium for milk containers, the question of possible reactions between metal and milk has assumed greater importance, especially as regards a possible effect of the metal on the vitamin C contents of the milk. The Italian Institute for Light Metal Research has collected data from the comparatively scarce literature on the subject, including Russian sources. According to these sources, the decrease as a function of time in the vitamin C contents of boiled milk kept in aluminium containers is not much greater than the corresponding loss in the case of fresh milk, while vitamin destruction is greater in most other types of vessels. Tests were also carried out to determine the effect of aluminium and tin containers on the micro-organisms present in milk. It was found that what little difference there is in the effect of aluminium and tin containers is generally in favour of the former.—L. Ranucci, *Alimentazione*, Oct., 1954.

ANTIOXIDANTS

Detection by Paper-Chromatography

By means of a relatively simple paper-chromatographic method, it is possible to detect up to two, or even three, of the antioxidants specially recommended at present, in solutions as well as in alcoholic extracts from lard or margarine fat. The method is partly based on staining differences with silver nitrate and dichloroquinone chlorimide solutions.—Summary of paper by K. F. Gander, *Fette, Seifen, Anstrichmittel*, Nov., 1954.

CHOCOLATE

Viscosity Measurement

To demonstrate the need for measuring the viscosity of chocolate at several points, the author explains the nature of viscosity and yield values and describes a rotary type of viscometer which permits an unequivocal interpretation of the rheographs and yield values. In order to compare the results with other viscometer measurements, it is necessary to introduce the conception of "plastic viscosity" which, in turn, requires the prior determination of yield value curves necessitating viscometer measurements at several points.—J. Kleinert, *Fette, Seifen Anstrichmittel*, 1954, **56**, 809.

CANNED MEAT

Rotary-Autoclave Sterilisation

Long-time high-temperature sterilisation of meat and meat products destined for canning adversely affects the meat, causing changes in colour, consistency, odour and taste. Therefore efforts have been made to accelerate sterilisation by different means. One of them is the use of autoclave sterilisers in which the cans are moved and rotated so as to ensure heat penetration in the shortest possible time. The Bacterio-

logical-Histological Institute of the German Federal Research Institute for Meat, Kulmbach, has carried out tests with a new type of "Rotoclav" made by a German firm (H. Kock, Lübeck). It was found that with this apparatus the heating times required for safe sterilisation could be significantly reduced, with the result that colour, consistency and aroma could be improved. This applies in particular to those meat products which at high temperatures are either in a liquid state or are releasing liquid, and which permit extraction of the liquid during the heating process. After the success of the first prototype apparatus, a bigger one for large-scale processing has been constructed and is now being tested.—H. Reuter, *Die Fleischwirtschaft, Dec.*, 1954.

LARD

Analytical Examination

Microbiological deterioration is rarely observed with lard itself, but certain raw fats are endangered, even before rendering, by enzymatically conditioned hydrolysis. In order to obtain lard of unobjectionable odour and taste, it is therefore necessary to obtain as rapidly as possible that temperature which inactivates the lipases. Storage and consumption properties are affected more by the moisture contents than by the occasional presence of bacteria and fungi. Although rancidity does not necessarily depend on a certain acidity value, it is desirable to limit the fatty acid contents of lard to 0·5%. The general quality of lard is susceptible to deterioration owing to primary and secondary oxidative decomposition processes, discernible in the "heating test." During this test, other volatile products may appear which may be significant even if they are neutralised by the odour of the rancidity products. The taste test must therefore be supplemented by chemo-analytical methods such as the neutral red reaction in conjunction with the heating test.—J. Wurziger and E. Lindemann, *Fette, Seifen, Anstrichmittel*, 1954 (11).

SAUSAGES

Bacterial Flavouring

A strain of bacteria has been found to have a particularly agreeable flavouring effect on sausages without being detrimental to the meat. The flavour is thought to be due to the fission of fat ingredients. Tests show that it is possible to improve the quality of sausages by the admixture of carefully selected and tested bacteria, provided that the sausages are dried, smoked and stored at temperatures around 56°F.—H. Keller and E. Meyer, *Die Fleischwirtschaft*, 1954, **6**, 453.

Pineapple Juice

(*Concluded from page* 112)

(1) Bromelin must be inactivated;
(2) Esters are recovered from the second and third effect condensates and then vacuum fractionated;
(3) It is believed that esters recovered from the summer juice are stored for addition to the winter juice;
(4) Centrifuging is carried out in an atmosphere of nitrogen to prevent loss of esters.

In conclusion some trends may be worth considering. There appears to be some interest in an "in the can" process instead of the conventional pasteurisation. Low-temperature concentration has just started, and its future progress will undoubtedly be watched with interest by many people. Hawaiian Pineapple Co. expect to save money on freight to the U.S.A., using the four-fold concentrate, even though low-temperature storage is required; this factor alone must interest Australia because of its geographical location.

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This paper was presented at the Fifth Australian Canning Convention and is published by permission.

Vitamins

(*Concluded from page* 110)

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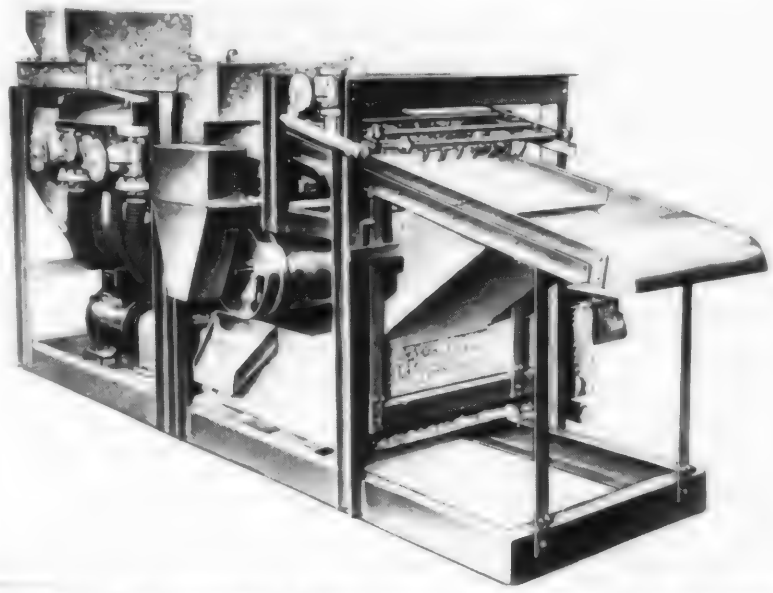
Machinery and Equipment

Stainless steel flotation washer

A new stainless steel flotation washer for peas, beans and similar products has been developed by Mather and Platt Ltd. Designed to provide a thorough wash, immediate inspection of the washed product, easy operation and control, adaptability for a wide range of conditions, quick and easy cleaning, economy, and sound construction, the machine is entirely automatic once it has been set.

After leaving the feed hopper, the peas meet an upward flow of water which conveys them forward but allows stones, sand, grit, etc., to sink to the automatic stone ejector. The flow then passes across a flotation section where the peas have time to sink but where the floating trash such as seed pods, leaves and stalks pass over a weir to waste. The washing water is then drained off and the peas pass over a shaker inspection unit where they are given a thorough fresh water spray to rinse off any dirty water which may be present and to remove bacteria. As the peas pass in a thin layer over the shaker inspection unit the effectiveness of the washing process can be estimated at once and any necessary adjustments made. Water velocities can be accurately adjusted to obtain the degree of sinking or floating required for separating different types of dirt from products with different floating properties. If required, the machine can work as a simple de-stoner with the flotation action eliminated. The heavy dirt and stones and floating trash all pass automatically through a trash drum which screens off the water into the main settling tank and passes the waste matter to a waste chute. The settling tank contains a specially designed baffle arrangement for precipitating suspended matter, which can then be drained off.

All pump and water connections are through flexible rubber hoses, secured by worm drive clips for easy dismantling, and all control valves are of a free flowing hygienic type. A standard Mather and Platt pumping unit is incorporated in the machine and can be readily removed. The shaker inspection unit has an independent motor drive.



Mather and Platt stainless steel flotation washer for peas, beans and similar products.

*

Feeding device for jar filler

A new automatic feeding device has been fitted by Robert Kellie and Son Ltd. to their type 7 F.P. jar filling machine, thus enabling the complete operation, from receipt of empty containers to automatic discharge, to be controlled by one person.

The 7 F.P. model is designed to fill jars and cans from ½ lb. to 3 lb. in size with any liquid or semi-liquid and discharge to the capping machine.

Liquid feed is by an all-bronze rotary displacement pump from the receiving tank, through a measure with micro scale, to the bronze interchangeable rotary nozzles. Jar movement is by detachable rotary carriers mounted on a patent anti-friction roller steel carrier chain with tension adjustment. All mechanisms are completely enclosed so that the machine may be safely hosed down, and access doors allow easy cleaning and lubrication.

Existing machines can be fitted with the new attachment.

*

"Cellophane" sheeting machine

The newly-developed B.C.L. sheeting machine, the first device of its kind to be offered to film users in this country, enables *Cellophane* film sheets to be cut from the roll at the greatest speed and in the widest range of sizes.

As film in roll form is cheaper per area than film in cut-to-size sheets, the use of this machine will reduce costs in ordering film stocks.

The machine consists of a strong steel framework with a wide base and two vertical supports. A horizontal shaft near the base carries the roll of film, held in position by adjustable cones. A further shaft is provided so that, if required, two rolls of film can be used at once. The spare shaft can also be used for running an interleaving material between the cut-to-size film sheets. A winding rack has a single and double bar, the spacing of which can be adjusted on calibrated cross-members. A central fixed bar connected to a handle allows the whole rack to be rotated. The double movable bar incorporates a spring-loaded film gripper. The leading end of the film from the roll is inserted between the two portions of the bar which then spring together to hold it firmly. The movable bars both carry slots which facilitate easy cutting action upon the thickness of film — a sharp knife or other cutting edge being used.

The base of the machine measures 2 ft. × 2 ft. 7 in. and its height is 4 ft.

*

Electronic pneumatic temperature transmitter

A non-indicating electronic potentiometer transmitter, designed for graphic panel applications where pneumatic temperature transmission is desired has been produced by Honeywell-Brown Ltd. Standard Brown components such as the continuous balance components of the *Electronik* potentio-

New moisture meter which operates over a wide range and can take samples up to 2,000g.

The new " Power " machine produced by Fredk. A. Power and Son (Box Strapping) Ltd.

meter, and the pneumatic transmitter unit and non-bleed pilot relay used in Brown rectangular case instruments, have been assembled into a compact measuring and transmitting device.

Since the transmitter is connected to the temperature sensing element by means of electrical conductors, it can be located at a distance from the point of measurement without introducing any lag into the measuring system. The transmitter can be used in conjunction with any indicating or recording receiver which operates over a 3 to 15 p.s.i. transmitted air range.

Further information and full details can be obtained from the manufacturers, 1, Wadsworth Road, Perivale, Greenford, Middlesex.

■

Wide-range moisture meter

Commercial moisture meters usually cover the limited range of about 5-25% moisture. But there are numerous substances which lie outside this range: *e.g.* tea 3-8%, coffee powders 1-4%, biscuits 1·5-5·5%, milk powder 2-5%, and many other materials such as drugs, cellulose products and inorganic substances which have similarly low moisture contents. At the other end of the range, emulsions, pulps and a host of foodstuffs contain 25-90% water. It is for the testing of products like these that a new instrument, the *Kappa* moisture meter, is uniquely fitted, for its moisture range is 0·5 to upwards of 60%. The meter was originally developed about 4 years ago by J. Lyons and Co. and was marketed by Toplis Simpson and Co. Ltd. who have now introduced an improved model.

An advantage not offered by most other meters is that the quantity of material taken for a test is large enough to minimise sampling errors and it can be chosen to suit its texture, bulk density and moisture content. The *Kappa* is designed to accommodate the particular sample cell that is best suited to the material and it can, within limits, be dimensioned to take shaped packets, etc. The quantity taken for test is rarely less than 100 g., except in cases of extremely low bulk density, and can be as great as 2,000 g. Abnormal requirements can sometimes be met: *e.g.* a *Kappa* meter is in use for the examination of bales of jute which are tested *en bloc*. Samples are not damaged by the test which takes about 2 min. to carry out.

The *Kappa* is light in weight, is easily transported and consumes only 40 watts from the standard 230v. A.C. supply. Other voltages are allowed for and battery operation is possible. Voltage stabilisation is not necessary.

The meter operates at a high radio frequency and employs frequency-sensitive circuits to detect and measure a change of capacity. This change occurs in the condenser which is, in fact, the sample container and the measurement actually made—and indicated on a direct reading scale in terms of moisture content—is a function of the increase of capacity of this condenser caused by the introduction of the sample.

Of all the substances likely to be present in the sample, water makes, weight for weight, by far the greatest contribution to capacity, and it is this property of water that is utilised in all moisture meters that measure capacity. But the relationship between capacity and moisture content is complex in that as the moisture content is raised steadily from a very low value, the electrical properties of nearly all materials change in two respects: (1) the capacity increases very slowly at first but then at a continuously increasing rate. This presents two problems: first, a minute change of capacity must be made measurable without resort to delicate or fragile components and, second, the response of the meter to change of capacity must progressively decrease as the change increases so that, in so far as is possible, a linear relationship between moisture content and scale reading is achieved over a wide moisture range. (2) The electrical conductivity of materials, as well as their capacity, increases with moisture content and the interfering effect of conductivity on measurement of capacity becomes so serious above 25% moisture that most meters are insensitive to further increase of moisture content. The conductivity effect can, however, be minimised — and almost completely eliminated except at very high water contents — by the employment of high radio frequency circuits.

The *Kappa* circuit operates at 10 Mc/s, its pointer movement—over a linear scale that can be coupled in turn to each of 6 moisture ranges—is as nearly proportional to moisture content as it is possible to make it and it employs a frequency sensitive circuit that detects a change of frequency of 2 in 10,000; accuracy of this order is necessary when samples of low moisture content are tested. Operation is simple: the sample is introduced and capacity then removed from a part of the circuit by operation of the range-buttons and pointer control until the effect of the capacity introduced is exactly neutralised, as indicated by a visible signal (a neon lamp). Fifty times as much capacity as that introduced by samples of very low moisture content is removed by these robust components, this 50:1 magnification falling gradually to about 12:1 in the highest moisture range.

■

Rotary air pump

Lacy-Hulbert and Co. Ltd. have developed a new model of their RB2 rotary pump. This is completely oil-free, and whether used for vacuum or

pressure no oil can contaminate the system or vessel to which it is attached. While previous models have been relatively free of oil it is claimed that no pump so far has achieved this absolute state. The RB2 rotary pump is used for continuous operation at vacua up to 25 in. Hg and pressures up to 10 p.s.i.

Maintenance is easy, as there are no pistons, springs or valves; the self-seating vanes are of a composition which will operate dry and lubrication is unnecessary. All parts are interchangeable; they are manufactured to fine limits and subjected to inspection before each complete unit undergoes test.

Full details of the RB2 rotary pump are available in leaflet form direct from the manufacturers at Boreas Works, Beddington, Croydon, Surrey.

*

Large pressure cooker

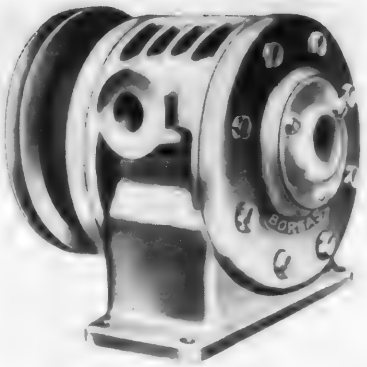
A new 10 gal. pressure cooker for food manufacturers, meat traders and manufacturers, caterers, farmers and others with large cooking requirements, is being marketed by Tempo Aluminium Ltd. Constructed of heavy aluminium, the cooker is compact, easily portable and simple to operate, being fitted with pressure gauge, a special safety valve, steam release cock, and a fusible plug as an added safety measure. Claimed to save at least one-third of the time required by ordinary cooking methods, the cooker is said to show great economy in fuel consumption—about three pennyworth of gas will cook 40 lb. of bones. With an overall height of 32 in., an overall width of 20 in., inside depth of 18 in., and a diameter of 13 in., the cooker has a working pressure range of 5 to 40 lb.

*

Direct reading pH indicator

A redesigned direct reading *p*H indicator has been produced by Cambridge Instrument Co. Ltd. Features of the new instrument are its robustness, reliability and simplicity in design and in operation. The manufacturers claim that the indicator need only be standardised against a buffer solution once a day and may then be left in the hands of less experienced technicians for routine readings, thus rendering it an ideal instrument for works or laboratory use in the large number of applications where very high accuracy of reading is not required.

The instrument incorporates an open-scale pointer galvanometer of great robustness. The *p*H is read directly on the 120 mm. scale, covering the whole *p*H range of 0 to 14, with sub-divisions to 0·1 *p*H. Readings can be easily taken to 0·05 *p*H or less. A second scale, range −400 to +1000mV, and readable by estimation



The new RB2 rotary air pump developed by Lacy-Hulbert and Co. Ltd.

to 2·5mV, is provided for measurements of oxidation reduction potentials or where absolute values of potentials are required. Temperature compensation for the electrode system is provided by rotating a dial at the front of the instrument, the range covered being from 10 to 100°C, while the method of standardising the instrument against the buffer solution is also very simple.

*

Electric "Bunsen"

An electric "Bunsen burner," said to combine the advantages of the gas burner with the cleanliness in operation and ease of control associated with electric heating, has been introduced by Electrothermal Engineering Ltd. The radiation from the heater is directed upwards to heat test tubes, crucibles, small flasks and beakers. It may also be used inverted to provide heat for evaporation processes. The Electrothermal "Bunsen" can therefore be used for most routine laboratory work normally carried out by the gas burner.

Made of corrosion-resistant metal, the apparatus consists of a specially formed replaceable heating element mounted in the top of a vertical tube, which forms the supporting case. This tube is provided with air circulation holes in the lower part; a concentric gap between the heating element and the casing prevents any undue temperature rise. Fitted with rubber feet to protect the bench, the heater can be comfortably held in the hand while operating. A cowl fitted to the top of the unit is designed to deflect heat radiation away from the hand.

Ten gal. pressure cooker designed for food manufacturers, caterers and others with large cooking requirements.

*

Automatic band strapping machine

A fully automatic band strapping machine, said to be five times faster than a hand strapping machine, operated with one movement of a foolproof single control handle has been produced by Fredk. A. Power and Son (Box-Strapping) Ltd., and is being marketed by their sole selling agents, The Package Sealing Co. Ltd.

The strapping material is automatically applied at the correct tension, lies flat with no sharp edges and affords maximum reinforcement and protection irrespective of the size of the package. A coil of special galvanised strip sufficient for 6,000 seals is carried inside the machine. Reloading is done in a few seconds.

This new machine reduces handling of packages and crates to a minimum. Packages are brought to the machine on rollers and need not be held while strapping is applied. It is capable of 16 to 18 straps/min. operating with ⅜ in. or ½ in. wide band strapping and will strap packages up to 20 in. wide by 21 in. high.

The machine, which will be shown for the first time at the National Factory Equipment Exhibition, Earls Court, March 28 to April 2, is self-contained with its own ½ h.p. power unit. It is easily made ready for operation by plugging into the main electricity supply.

Further information on the machinery and equipment described can be obtained by writing to the

Enquiry Bureau,
FOOD MANUFACTURE,
9 Eden Street,
London, N.W.1.

News Digest

Beecham form new company to direct food interests

Beecham Group Ltd. have taken a long lease of Airways House, Great West Road, Brentford. This property is currently occupied by B.O.A.C., who will shortly be moving to new premises at London Airport.

The building will be re-named "Beecham House" and it will become the head office of Beecham Group Ltd., and also the centre of operations for a major new company which is being formed within the Group.

This new company—to be known as "Beecham Foods Ltd."—will be a direct subsidiary of Beecham Group. Mr. H. G. Lazell, who is managing director of Beecham Group, will be chairman of Beecham Foods, and Mr. R. Craig Wood (who recently joined the board of Beecham Group) will be managing director. He was formerly managing director of Thomas Hedley's.

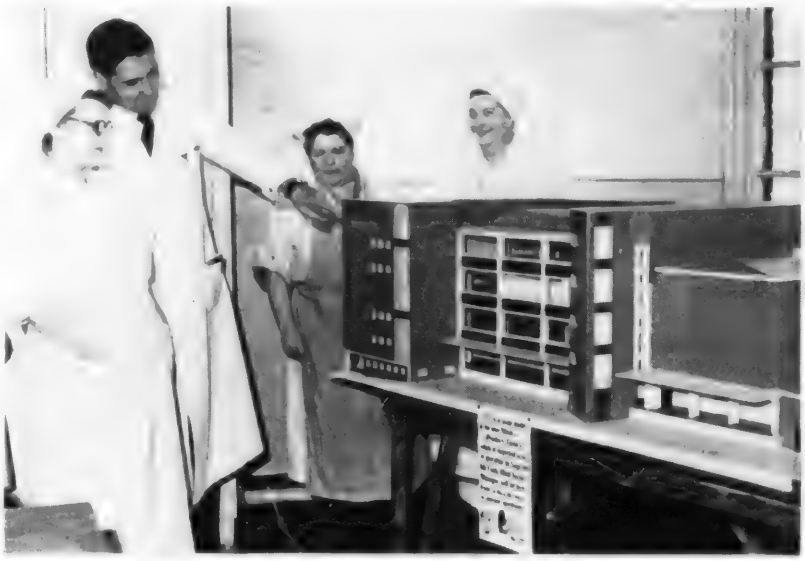
Beecham Foods will co-ordinate and develop the operations of various group companies in the food and allied fields. These include Lucozade Ltd.; C. and E. Morton Ltd. (Morton's Peas, Beans, etc.); R. S. Murray and Co. Ltd. (Murraymints, etc.); Harold F. Ritchie Ltd. (Grocery Sales Force); and the newly acquired company, H. W. Carter and Co. Ltd. (*Ribena, Quosh*). In its various divisions, Beecham Foods will employ over 3,000 people, with factories at Brentford; Coleford, Glos.; Lowestoft; Manchester; Millwall; Newcastle and Belfast. There is also a substantial export business.

The company has plans for a considerable strengthening and expansion of its business in these fields. The new arrangements should also make for improved efficiency — particularly in selling and distribution.

Shortage of Scottish prime beef

The north east of Scotland, traditionally a beef producing reservoir for the rest of the country, has warned that shortages can be expected for the rest of this year. The shortage of prime beef, which has resulted in a nationwide demand and increased prices, is said to be due to the sale of leaner cattle after the raising of controls.

While the problem is essentially one for meat traders it affects all food trades since the tendency will be to seek alternative foods. Eggs have come down in price and are a reasonable substitute, table poultry is in good supply and may also assist in the scarcity of prime beef. Imported beef will also help and is rather lower in price. The real problem posed by this situation is that the nation has again become quality-conscious: the demand is not so much for beef as for good beef. There are ample supplies of varied foods at lower prices, but the quality food is scarce and consequently more costly; in time, of course, this situation will balance itself but meantime the essential problem for the food trade is how best to organise future policy so as to upgrade the bulk of its output and make available to the public the food that it demands.



NEW MEAT FACTORY

Mr. Bruce Cook, newly-appointed manager of the £650,000 meat-products factory which T. Wall and Sons Ltd. are building on Godley Hill, near Manchester, showing a model of the new factory to three of the company's employees. The factory, due to be completed next autumn, will employ between 400 and 500 workers engaged in producing sausages, meat pies and other meat products.

R.S.I. Health Congress

The Food and Nutrition section of the Royal Sanitary Institute's Health Congress at Bournemouth, April 26-29, will meet under the presidency of Dr. J. H. Bushill, F.R.I.C., on April 27. The president's address will be followed by a discussion on "The Contribution of Processing Techniques to the Nutritional Value of Food," to be opened by Prof. John Yudkin on "Normal Processing Techniques" and Dr. A. J. Amos on "Fortification."

Belfast bakery firm acquired

Inglis and Co., bread, biscuit and cake manufacturers, has bought the Belfast bakery firm of John McWatters. The company will retain its identity and trade under its old name.

Social status of the salmon

A recent announcement by the World Health Organisation gives statistical confirmation of the well-known fact that fresh salmon, the poor man's diet of a century or so ago, has now become a luxury food in the British Isles, owing to heavy pollution of river estuaries which is causing this fish to disappear. Quoting the River Tees as an example, W.H.O. points out that, in addition to industrial wastes, 12 million gal. of crude sewage are poured into its estuary every day. At the beginning of the century the average annual catch in this river was 8,000 salmon; in the twenties it had fallen to 3,000; in the early thirties to 2,000; in 1937 to 23; today, no more salmon are caught. "It looks as if in Britain fresh salmon will climb to ever greater social heights," adds the announcement.

Fifty years with Horlicks

Mr. O. P. Horlick, chairman of Horlicks Ltd., completed fifty years' unbroken service with the company on January 5 last. Mr. Horlick, who also celebrated his 70th birthday two days later, was presented with a book containing the signatures of the directors and staffs of the Horlicks Group of Companies throughout the world. To mark the occasion the company issued a special edition of their magazine, "The Gossiper."

Kestner's chairman visits Africa

Mr. J. Arthur Reavell, M.I.MECH.E., M.I.CHEM.E., F.INST.F., F.I.M., chairman of the Kestner group of companies, is visiting South Africa and Southern Rhodesia. He will be spending a few weeks at the headquarters of Kestners (South Africa) (Proprietary) Ltd., in Johannesburg, and also visiting the principal towns of the Union and Southern Rhodesia during his tour.

Cold storage of apples

On Members' Day, February 1, at East Malling Research Station, over 200 samples of Cox's Orange Pippins from nearly 100 growers in 11 counties were arranged in the Station's packing shed for Members to examine. The fruit had been cold stored under uniform conditions at 37°F. and taken out of store at a late stage, when differences in condition and in the incidence of rots were marked.

Visitors were welcomed by the Director, Dr. F. R. Tubbs, who mentioned the background of fruit storage research at the nearby Ditton Laboratory, at Long Ashton and at the Imperial College, in collaboration with which centres the present investigations at East Malling were being undertaken.

The experiment aimed at collecting information from fruit grown under a wide range of conditions on commercial farms. The label on each sample gave brief details of pre-storage treatments. Members examined the displayed fruit with interest until lunch time. During the afternoon Dr. H. B. S. Montgomery, in charge of the experiment, discussed the findings of previous research on fruit storage problems and briefly mentioned what had been done since the investigations started in 1952. He then described in detail how the present experiment had been run, and discussed the results. Growers who had supplied the fruit and made the experiment possible were warmly thanked.

An interesting discussion followed, during which some of the growers whose samples had kept in best condition gave further details of the conditions in the orchards concerned. About 250 Members were present.

OBITER DICTA

● In the theatre cold tea used to be used as stage whisky; now hot whisky is being used as stage tea. —*Mr. Jimmy Edwards.*

● On British Railways a man came to serve me and I could have eaten a couple of meals off his waistcoat. —*Mr. Chapman,* M.P. *for Northfield.*

● Highly paid industrial workers have no right to food so cheap that a decent living cannot be paid to those who produce it. —*Mr. Cyril Osborne,* M.P.

● The fried fish trade is the one walk of life where it is an advantage to be bald; hair can hold the smell of frying for a long time.—"*The Economist.*"

● He told me, "my greatest thrill was watching the President of France eating a soufflé I had cooked. He died a week later." —*Gossip columnist in "Sunday Times."*

● Soon all the world will be able to see itself starving to death through up-to-date television sets. — *Mr. Aneurin Bevan, reported in the "Daily Express."*

● Nowadays there are sweets of different names and colours but they all taste of sawdust, glue, and substitutes. — *Letter in the "Sunday Express" lamenting the disappearance of old-fashioned sweets.*

● There are, perhaps, no grounds as yet for a suggestion that the increase in stomach ulcers and other such troubles can be laid firmly at the door of the food factories. — "*Irish Times.*"

● We must not get into the habit of thinking that because a substance is a chemical it is necessarily harmful when added to food.—*Dr. Charles Hill, Parliamentary Secretary, Ministry of Food and Agriculture.*

● Frozen foods of a sort were known even to the early Romans. In the first century A.D. salmon packed in snow or ice was sent from the Rhine or Loire to Rome. —*Twentieth Century Fund Report.*

● French newspapers call him "the Genius of the Kitchen", "King of the Cooks" and "the Dynamic Chef from the Midi". At the soup-tasting he showed how mushroom soup could be made from the Maggi tablets in ten minutes.—*Report of a soup-tasting in Glasgow.*

Britain drank half world's tea last year

Great Britain last year consumed 500 million lb. of tea—half the world's tea production and 40 million lb. more than in 1953.

This was stated last month by Mr. Kumar Ghosal, chairman of the India Tea Board, who recently led a tea auction committee which studied markets in Britain and Ceylon.

New gooseberry flavour

Following the addition, in July last, of Witham Strawberry Flavour to their range of "true-to-the-fruit" flavours for food products, W. J. Bush and Co. Ltd. are now introducing Witham Gooseberry Flavour. The flavour is claimed to be particularly effective in jelly sweets of all types where the character of the original fruit is more readily appreciated, and it is said to offer further opportunities for the introduction of new and appealing confectionery of all types. The name is derived from the town of Witham in the heart of the fruit-growing area of Essex, where Bush have their fruit processing factory.

Samples of confectionery sent to FOOD MANUFACTURE bear out the company's claims for their new flavour.

"Dead Sea bacon" charge refuted

A statement issued by Mr. Collan E. B. Brett, a director of T. Wall and Sons (Meat Products) Ltd., and himself a pig-breeder, referring to a criticism by Mr. G. S. Bache that some British bacon tasted "as if it had been cured in the Dead Sea," said that bacon curers could not be blamed for Mr. Bache's troubles. Almost without exception, they used the same system as Danish factories. No curer, however, could get uniform results if the raw material varied.

"Some meat is naturally wet and spongy," said Mr. Brett, "and in such cases there is not much the curer can do about it. Even smoking will not dry it. On the other hand, some meat just mops up the brine.

Mr. Brett thought that in neither case was it fair to blame the bacon curer. The type of pig, the variety of feeding methods used, the housing of the pig and its age at slaughter all had a bearing on the problem. These considerations were vital to the Wiltshire curer if his product was to match up to the best imported bacon. His raw material—the pig—must be of a high quality: it must be young, well fed, and much more standard a product than was the case today.

"There may be some curers who do not know their jobs," concluded Mr. Brett, "but in these days when all are paying the same price for their raw material, the unskilled are obviously not going to last very long."

COMPANY PROFITS AND PROSPECTS

Heinz's dividend up

The board of H. J. Heinz and Co. Ltd., manufacturers of the "57 Varieties" of foods, announces a quarterly Ordinary dividend of 8%, against 7%.

*

Liebig's profits lower

Liebig's Extract of Meat, proprietors of Oxo and other meat products, announced a slight decline in earnings for the year ended August 31, 1954. Group trading profit fell from £2,438,903 to £2,379,407 and net profit amounted to £740,613 (£901,095). Total dividend is unchanged, at 10% tax free.

*

Sugar company's record turnover

Mr. R. Berisford, chairman of S. and W. Berisford Ltd., announced in his report for the year ended September 30, 1954, that although the Group had achieved a record turnover of almost £40m.—an increase of about 25% over the previous year—trading profits were lower. Consolidated trading profits amounted to £199,523 (£262,129) and net profit to £101,248 (£108,548).

*

Procea's expansion

According to a progress report issued by Procea Products Ltd. with the interim dividend warrants, continued progress has been made in the development of the wrapped and sliced small *Procea* loaf. The company is now operating six depots in addition to its own bakery, a further three depots having been opened since the April meeting. The company will endeavour to open further depots.

*

Tea blenders profits fall by £10,000

Group profit of Twining Crosfield and Co. for the year ended October 31, 1954, amounted to £97,600, a reduction of £26,700 on the previous year's record of £124,400. During the year the price of Indian common tea increased from 3s. 4d. to 6s./lb., and intense competition in the retail trade made it impossible for the whole of the increase in price to be passed on. Therefore, the company's net result is £10,000 down at £39,000.

*

U.K. buys more Carlsberg beer

Carlsberg Breweries (Copenhagen) announce that in the year ended September 30, 1954, exports rose by 4,000 hectolitres to some 154,000 hectolitres. More beer was sold to the U.K. than ever before and sales to other European markets were also good. During the year 1·2m. hectolitres of beer (1·3m. hectolitres, 1952-53) were sold—60% higher than production in 1939. In addition to 352m. bottles of beer, 67m. bottles of mineral waters were sold. Gross revenue amounted to Kr. 219m. (Kr. 239m.).

*

Sugar factory's losses

Antigua Sugar Factory announces a net loss, after tax, of £19,000, against £16,000 net profit. Proceeds of sugar and by-products were down to £500,000, against £1,209,000. The chairman stated that there was a serious decrease in the crop owing to drought.

*

Record year for Ceylon tea

Mr. N. S. Pryor, chairman of the Central Province Ceylon Tea Co., said in his annual address for the year ended June 30, 1954, that it had been the best year in the company's history. Consolidated profits amounted to £772,432 (£560,375). Estate and bought tea of the parent company amounted to 3,937,332 lb. (3,378,399), realising a net price of 39·97d./lb. (33·03d.). The subsidiary company's total of 627,106 lb. (556,470) realised 43·59d./lb. (39·33d.).

*

Expansion of invalid food company

Lt.-Col. J. E. Ridley, chairman of Brand and Co., manufacturers of invalid preserved foods, etc., announced in his report for the year ended September 30, 1954, that capital expenditure would be much greater in the coming year. In addition to renting a new site from British Railways for an engineers' shop, the cold storage and boiler capacity would be enlarged and it was hoped that building would commence during the year. A subsidiary factory might be sought elsewhere in the near future, he added.

*

Less demand for packet goods

Total group profit of Foster Clark Ltd. for the year ended September 30, 1954, amounted to £30,449 (£57,190). The chairman said that changes in public taste have affected the demand for those products on which the company's prosperity was built and the year's sales of canned fruit and vegetables have almost equalled those of the packet goods lines. Despite this, the turnover for the year exceeded that of the previous year and bears out the board's view that the policy of expansion is in the best long-term interests of the stockholders, although it is naturally limiting immediate profits.

Egg company's profits fall

Consolidated profits of E. F. Fairbairn Holdings Ltd. for the year ended September 30, 1954, amounted, after taxation, to £34,964 (£55,377). The chairman's review attributed the lower profits to three main factors: weather, Government bulk import of eggs, and the delayed issue of the Government Price Review. The capacity of the company's hatcheries is steadily increasing and incubators are being made in large numbers to meet world-wide demands.

Erections and Extensions

Sun Valley Nut Products, Ltd., are extending their factory premises in Price Street, Birkenhead.

*

A pea canning factory is under construction on a site at Colchester, Essex, for **Crosse and Blackwell, Ltd.**

*

M. Firkin, Ltd., pork pie makers, 25, Carters Green, West Bromwich, are seeking permission to construct new factory premises in the town on a site at Bromford Lane.

*

The erection of a new confectionery factory is planned at South Street, Greenock, by **Messrs. R. Walker,** of 6, South Street, Greenock.

*

Allied Canners (Boothstown), Ltd., Lydiate Hall, Lydiate, Lancs., are planning to erect a new factory on a site at Skelmersdale, Lancs.

*

Swift and Co., Ltd. have had plans prepared for the construction of a meat storage depot at Grove Street, Cheltenham, Glos.

*

A canning plant in Dundee to can raspberries and other produce from that area is being planned by **Morrell and Co.** of Lincoln, who have made arrangements to start work in the middle of 1955. It is planned to employ 80 people on a year-round basis rising to 140 at peak periods.

*

Weston Biscuit Co. Ltd., Sighthill Industrial Estate, Edinburgh, are shortly to start construction of a modern biscuit factory on the estate. The company has had the site for many years and proposed this expansion at a much earlier date, but failed then to secure building permission. Dean of Guild approval has now been given and an early start is expected.

Among the exhibits in this display of early canned foods are (top centre) roasted veal, carrots and gravy prepared in 1824. In the bottom row, from left to right are: potato soup and pemmican (1840), ox tongue, dried carrots (1855) and marrowfat peas. The portrait on the left is of Nicolas Appert and on the right of Bryan Donkin, F.R.S.

History of canned foods

A special exhibition, which recently opened at the Canned Foods Advisory Bureau, 17, Wigmore Street, London, W.1., outlined the history of canned foods. The following individual exhibits created considerable interest:

A Christmas pudding canned at the beginning of this century; two of the actual beer cans that survived the blast of the Atomic test explosion at Monte Bello in 1952. The beer was found to be uncontaminated and declared fit for human consumption; a can of corn meal discovered on the sea shore in 1951. It was part of the lease-lend cargo of an American merchant ship torpedoed during the war. Prior to being washed up on the shore it is estimated that the can rolled backwards and forwards across the sea bed for a period of about ten years. From a careful inspection of the exterior there is nothing to suggest the contents are not still fresh; a can of oyster soup sealed in 1890; a field service ration and a self-heating can of soup prepared for troops fighting in the Boer War; a canister which contained dried beef for soldiers fighting in the Crimea—100 years ago.

Food at the Ideal Home Exhibition

Many new products will be displayed in the Food Section of the *Daily Mail* Ideal Home Exhibition at Olympia from March 1-26.

The British Vitamin Products Ltd. will show two new fruit juices, peach and apricot, and introduce a 7-oz. size bottle, designed primarily for home consumption.

Cooked samples of a new onion soup mix will be served to visitors by Batchelors Peas Ltd.

Soloro, the new Vitamin C glucose orange crush, will be featured by Solo Orchards Ltd.

Another new glucose product, *Glucovinos* tonic wine, will be displayed by Jules Duval and Co. Ltd.

The Oppenheimer Casing Co. (U.K.) Ltd. will show their new meat tenderiser—*Meatendra*. One small 2s. 6d. jar tenderises 75 lb. of meat. Samples of steaks treated in this way will be given to housewives who visit this stand.

Among other food exhibitors this year are:

The Shredded Wheat Co. Ltd., Hovis Ltd., J. A. Sharwood and Co. Ltd., H. J. Heinz and Co. Ltd., Superise Flour Co. Ltd., Farquhar North and Co. Ltd., E. Shaw and Sons, Sasso Olive Oil (Guy Leonard and Co. Ltd.), Rayner and Co. Ltd., Baxter and Son Ltd., Keen Robinson and Co. Ltd., Peek, Frean and Co. Ltd., Chivers and Sons Ltd., Bovril Ltd., Whiteways Cyder Co. Ltd., Meredith and Drew Ltd., L. E. Pritchitt and Co. Ltd., Nutrex Ltd., Anglo Italian Preserves Ltd., Cadbury Bros. Ltd., H.P. Sauce Ltd., Crosse and Blackwell Ltd., The Marmite Food Extract Co. Ltd., New Zealand Dairy Products Marketing Commission, The Nestle Co. Ltd., Chef Products Ltd., James Keiller and Son Ltd., the Commonwealth of Australia, "Swel" Pure Food Products and Field and Co. (Fruit Merchants) Ltd.

APPOINTMENTS AND RETIREMENTS

Mr. W. H. Miles has resigned his appointment as chairman of Tyspane Tea Co. He retains his seat on the board. Mr. W. R. T. Picton-Warlow has been elected chairman of the company.

*

Mr. A. G. Smith, a director of Elkes Biscuits (Leicester) Ltd., has been appointed Chairman of the Council of the Cake and Biscuit Alliance, Ltd. Mr. Smith succeeds Mr. Rupert E. Carr (of Peak, Frean and Co., Ltd.) who has held the office for the full term of three years. The new Vice-Chairman is The Hon. Gordon W. M. Palmer, a director of Huntley and Palmers, Ltd., of Reading.

*

Sir Edmund Bacon, a director of Lloyds Bank, has accepted an invitation to join the Board of the British Sugar Corporation.

*

Mr. M. Bengtsson and Mr. N. G. Sparkes have been appointed directors of Rowntree and Co. Ltd.

*

Mr. M. D. C. Watson has been elected a director of Craig Tea Estates in place of Mr. D. W. Watson, who has resigned.

*

Dr. H. M. Stanley has been appointed Controller of Research and Development of The Distillers Co. Ltd., in succession to Dr. F. Roffey, who remains technical director of the company and has taken on the additional duties of personnel director of the company's Industrial Group.

*

Mr. N. F. Patterson, director and general manager of production of Monsanto Chemicals Ltd., has been appointed operations director responsible for all manufacturing operations of the company.

*

Mr. Derek Ormond, who joined the Food Department of Fredk. Boehm Ltd. in April 1954, has been appointed their representative in Lancashire and Yorkshire. In these counties he will also represent Schimmel Boehm Ltd.

*

Mr. Bernard Thistlethwaite, O.B.E., F.C.A., secretary, and Mr. John L. Allison, export manager, have been appointed directors of Howards of Ilford Ltd.

Meat Inspectors' exams

At an examination for Inspectors of Meat and Other Foods, held in London on December 10 and 11, 29 out of 52 candidates were successful, reports the Royal Sanitary Institute.

FORTHCOMING EVENTS

Institute of Refrigeration

March 31. "Modern Trends in the Storage of Fruit and Vegetables," by W. H. Smith, W. G. Burton, and J. C. Fidler, 5.30 p.m., Institution of Mechanical Engineers, 1, Birdcage Walk, Westminster, London, S.W.1.

Institute of Packaging

March 28. "Paper and Cardboard as a Packaging Medium," by A. Holden, 6.30 p.m., Exchange Hotel, Liverpool.

Society of Chemical Industry

Food Group

March 9. "The Problem of Protein Haze in Beer," by E. C. Barton-Wright; "Factors Affecting the Water Content of Meat," by E. H. Callow, 6.30 p.m., Chemical Society's Rooms, Burlington House, Piccadilly, London, W.1.

March 23. Annual General Meeting followed by "Some Aspects of the Metabolism of Fat," by S. J. Folley, 6.30 p.m., Chemical Society's Rooms, Burlington House, Piccadilly, London, W.1.

March 29-31. Symposium on Bacon: All meetings unless otherwise stated will be held in the Department of Geology, Queen's University, Elmwood Avenue, Belfast.

Tuesday, March 29. Chairman: Dr. E. Mayne Reid. 10 a.m.: Opening Address by J. I. Magowan, M.R.C.V.S., D.V.S., Permanent Secretary to the Ministry of Agriculture, Government of Northern Ireland. 10.20 a.m.: "Pig Breeding," by I. H. Heaney, M.AGR. 11.15 a.m.: "The General Management of Pigs," by W. Andrew Biggar, M.C., M.SC. 2.30 p.m. (Chairman: T. H. C. Price, Esq.): "The Nutrition of the Pig," by Prof. R. G. Baskett, O.B.E., M.SC., A.R.I.C. 3.30 p.m.: "The Chemical Composition and Nutritional Value of Bacon," by L. C. Baker, M.SC., F.R.I.C.

Wednesday, March 30. Chairman: Sir Kenneth Sinclair. 10 a.m.: "The Technology of Bacon Curing," by E. H. Callow, B.SC., PH.D., F.R.I.C. 11.15 a.m.: "Practical Aspects of Factory Processing," by Lt.-Col. J. F. Evans, T.D. 2.30 p.m. (Chairman: Dr. J. H. Bushill): "The Canning of Bacon," by E. F. Eaton, B.SC., F.R.I.C. 3.30 p.m.: "Consumer Preference in Bacon," by T. Johnston. 7 p.m. (for 7.30 p.m.): Informal Dinner at the Midland Hotel, York Road, Belfast.

Thursday, March 31. 10 a.m.: Visits to Bacon Factories: Henry Denny and Sons, Ltd., Portadown; Northern Ireland Farmer's Bacon Co. Ltd., Cookstown; J. and T. Sinclair and Co. Ltd., Belfast; The Producers Bacon Co. (Collin Glen), Ltd., Belfast.

These two Gold Coast stamps are miniatures of photographs taken by Paul Redmayne, Cadbury's advertising manager. The 6d. stamp shows a West African cocoa farmer flashing the pods from the trees, and the 5s. stamp depicts two surf boats fighting their way through mountainous seas. This picturesque and hazardous way of loading cocoa into cargo-boats at Accra will cease when the new harbour at Tema makes direct loading possible.

Alcohol and Nutrition

The Nutrition Society is holding a symposium at St. Mary's Hospital Medical School, London, W.2., on Saturday, March 12, 1955, on "Alcohol and its Nutritional Significance."

The chairman will be Dr. H. E. Magee (Ministry of Health, London) and the following contributions have been arranged:

Prof. E. M. Jellinek (Geneva): "Drinking Patterns in Relation to Nutrition."

Dr. J. Tremolieres, Dr. E. le Breton and Dr. L. Dontcheff (Paris): "The Contribution of Alcohol to Calorie Requirements."

Dr. M. Weatherall (London): "Some Pharmacological Effects of Alcohol."

Dr. H. M. Sinclair (Oxford): "Vitamin Deficiencies in Alcoholism."

Prof. B. S. Platt, C.M.G. (London): "The Importance of Alcoholic Beverages in Indigenous African Communities."

Mr. A. W. Wilkinson (Aberdeen): "The Use of Alcohol in Intravenous Feeding."

Further particulars may be obtained from the Programmes Secretary of the Nutrition Society, Dr. R. J. L. Allen, c/o Monkhouse and Glasscock Ltd., Snowsfields, London, S.E.1.

Research Fellowship in flavouring

A post-Doctorate Research Fellowship in Natural and Synthetic Flavouring substances has been established at the University of Sheffield by the Birmingham Chemical Co. Ltd. (a subsidiary of the Staveley Coal and Iron Co. Ltd.). This will be under the direction of Prof. R. D. Haworth, F.R.S. The first holder is Dr. A. N. Waldron, PH.D., B.SC.

Bakers should have more enthusiasm for their work

Deploring the fact that at a time when the British public was spending more money than ever on food the baking industry was suffering a decline in sales, Mr. J. Price, marketing director of Craigmillar and British Creameries Ltd., said that his company wanted to help in reviving enthusiasm for bakery products. He was speaking at a dinner given by his company for the bakery and food trades' press in London recently.

Mr. Price thought that the public tended to be suspicious of the ingredients used by bakers, comparing them unfavourably with what the housewife used at home. Bakers should not be apologetic, said Mr. Price; in his view the public would be glad to know that bakers used top-grade margarine and flour. And why not admit they used frozen egg, a perfectly good food? Mr. Price said that he had had 30 years' experience of baking and he and his company would heartily welcome a return of the enthusiasm for its work which once characterised the industry. It should improve hygiene, service, presentation and standards of baking.

Mr. S. E. Marsden, advertising manager of the company, proposed the toast of "The Press" and praised it for its important educational work.

Obituary

Mr. Walter Shippam, aged 83, one of the five original directors of C. Shippam, Ltd., preserved food manufacturers, of Chichester, on January 4.

*

Sir Edward Mellanby, F.R.S., the former secretary of the Medical Research Council, on January 30 at the age of 70. During his career, Sir Edward Mellanby initiated and in many instances carried out important research in nutrition. In the early 1920s he was concerned particularly with vitamin D. Since the war his most important contribution was on the effect of agenised flour on dogs. His observation that agene induced canine hysteria led to the recommendation that the use of this chemical as a flour improver should be discontinued. This recommendation is now being put into effect.

Food News Overseas

New South African processed milk

A recent development in the marketing of milk in South Africa has resulted from the preparation, in some areas of the country, of a specially processed form of sterilised and homogenised product. The milk is sold in airtight bottles and is said to keep almost indefinitely in this type of container. Experiments are being made by one or two dairies in marketing the milk in flavoured form. According to the "Overseas Review" of Barclays Bank D.C.O., it is not yet known to what extent the process will prove popular and whether it will affect the overall consumption of milk in the country.

Embarrassing food surplus in the U.S.

The world's greatest accumulation of surplus food continues to pile up in the United States in spite of the Government's vigorous efforts to get rid of it. Agricultural experts estimate that the surplus food and other farm products now crammed into warehouses, laid-up ships, storage bins, and caves all over the country is worth about £2,700 million.

Laws passed by Congress to protect the farmers' incomes compel the Government, through their Commodity Credit Corporation, to buy up surpluses of many crops and dairy products so that they do not glut the market and force prices down.

As a result, at the end of 1954, the corporation were the unhappy holders of about £108,400,000 worth of dairy products alone, including 266 million lb. of butter, 335 million lb. of cheese, and 95 million lb. of dried milk. The corporation have also collected a year's supply of excess wheat, about 584 million bushels of corn, 375 million lb. of cottonseed oil, and a variety of other commodities.

The disposal programme which got under way last year consists of a multi-million dollar free food allocation at home and abroad, special bargain sales, sales abroad for foreign currency, bartering of agricultural stocks for strategic materials from other nations, and sales to commercial interests in the United States.

Complications soon developed to hinder this apparently simple solution. Foreign producers like Australia, New Zealand, Canada, and Denmark quickly objected to what they feared constituted "dumping" of subsidised farm products in the overseas markets which they traditionally serve. Their complaints drew assurances from the U.S. Government that before any foreign sales were concluded, friendly nations exporting the same commodities should be consulted and reasonable precautions taken to prevent any undue disruption of world prices.

The Department of Agriculture regard the surplus butter stocks as a major problem because of the relatively short spoilage time. Of all the excess butter of which the Government disposed last year, almost 94% was given away free at home and to needy foreign countries.

Canadian International Trade Fair

Prof. Dr. Ludwig Erhard, Minister of Economic Affairs for the Federal Republic of Germany, is to open the Eighth Canadian International Trade Fair in Toronto on May 30. Applications for space have been received from 22 countries and it is already evident that the fair will be larger than in 1954.

Frozen concentrated milk

Frozen concentrated milk which is said to taste like standard bottled milk has been developed at Iowa State College, reports *Chemical and Engineering News*. The frozen milk also has the same food value as ordinary milk and is capable of being handled at a cost feasible for popular use. The process by which the concentrate is prepared is a routine one and requires no special equipment.

At Iowa State College it is produced by using raw milk which is standardised to a 3·5% butter fat content, and pasteurised for 16 sec. at 180°F. This milk is then homogenised at 2,000 lb. pressure and condensed until two thirds of the water is removed from it. Then it is pasteurised a second time for 16 sec. at 180°F., and homogenised again at the same pressure. The resulting concentrate then is poured into quart cans, sealed, and frozen. It is stored in lockers at temperatures from −15° to −20°F.

A canned quart of this frozen concentrate may be expanded to three quarts of homogenised whole milk simply by adding two quarts of water and stirring.

Cans containing the concentrate may be kept in a home refrigerator for two weeks without danger of spoiling and may be stored more than five months in freezer lockers at temperatures from −15° to −20°F.

More canned soft drinks for U.S.

Canned carbonated beverages may ultimately reach the 12-billion-a-year mark in the United States if cans for soft drinks follow a trend that has been going on for the past two decades, said Mr. E. K. Walsh, assistant general manager of sales for the American Can Co., at the annual Convention of American Bottlers of Carbonated Beverages.

Quoting the history of canned beer as a possible gauge of the future of canned soft drinks, for which 1954 was "a year of development", Mr. Walsh said that the annual production of beer cans now runs to more than 6 billion. This is one of the reasons why the overall consumption of canned products in the U.S. has jumped from 130 a year per family in the early 1900s to almost 800 cans today.

Check on canned meat

In future there will be no unsavoury tinned meats in South Africa; as from this month (March) all tinned meats will have to look attractive and be absolutely hygienic. The task of enforcing the compulsory meat specifications will be carried out by the South African Bureau of Standards, and Inspectors will make their first visits to the unsatisfactory meat canning factories in March. Imported tinned meat will also be subject to official scrutiny. At the moment, according to an official of the South African Bureau of Standards, there are 27 meat canning factories in the Union and South West Africa, canning 9 million lb. of meat a year. Many of the factories are producing a world-class article but a few have caused complaint on the score of quality and hygiene.

The Department of Economic Affairs, concerned that this growing industry might earn a bad reputation overseas, decided in 1954 to clamp down on careless handling. Most of the complaints came from South African firms buying the produce. In March inspectors will visit all factories and will test samples taken at random. Some specimens will be sent to Pretoria to the microbiological laboratories for scientific testing. The official said that until October, 1953, similar complaints were made about some brands of South African canned fish. The bureau was asked to enforce compulsory fish canning specifications, since when there has been a marked improvement in the quality of canned fish.

Mexican poultry industry planned

The Mexican Department of Agriculture plans to distribute a total of 1,200,000 baby chicks to poultry raisers this year in an effort to develop a poultry industry in the republic and cut down the import of eggs and chickens. It is expected that the total number of chicks distributed will reach at least 2,000,000 by June, 1956.

According to Department of National Economy figures, Mexico is importing 600,000 eggs a day from the U.S. as well as 2,880,000 chickens annually. Poultry shortages have been chronic in Mexico and the current egg scarcity has boosted egg prices to 75 centavos apiece (6 cents.), whereas normal rates fluctuate from around 30 to 40 centavos an egg (about 2¼ to 3¼ cents.).

New Irish chocolate crumb factory

A new chocolate crumb factory to be set up at Dromkeen, Co. Limerick, will, when in full production, give employment to more than 100 workers. A 15 years lease has been obtained on premises owned by the Condensed Milk Co. of Ireland, Ltd.

In 1953 the chocolate crumb industry, a post-war development in the Republic which rose in a few years to a £7,000,000 a year business, slumped considerably, due principally to the milk situation in Britain. With derationing in Britain, surplus army foodstuffs, including tons of dried milk, were unloaded on the market. This was used by British chocolate manufacturers and the Irish chocolate crumb trade dropped by nearly a quarter in a few months. Now, however, there is a demand for the Irish product again.

Record U.S. meat production forecast

A record U.S. output of 26 billion lb. of meat is forecast for 1955—half a million lb. more than the record reached in 1954—thus assuring American housewives a bountiful supply of all types of meat from which to choose, Mr. J. M. Foster, Chairman of the Board of the American Meat Institute, declared recently.

"The industry never has been in a better position to satisfy the meat-buying wants of the public," Mr. Foster asserted. "Fortunately, the livestock and meat industry has been able to keep supplies in pace with the steadily mounting population which has now reached 163 million, and it would appear there is little danger of the industry's not being able to produce enough meat within the foreseeable future. A record 94,700,000 head of cattle and calves were on hand at the start of 1954 and we expect to start 1955 with about the same number. Sheep and lamb numbers also are expected to be about the same.

"Consumers will have much more pork during the next few months, reflecting the fall pig crop which was 11% greater than that of 1953. The 1955 spring pig crop is expected to be between 2 and 5% bigger than a year ago, which should also provide more pork supplies during the latter part of the year."

Mr. Foster added that the meat packing industry was facing up to the challenge of doing its part in continuing to provide an adequate supply of meat at reasonable prices for the American people. The industry continued to devote attention to extensive research directed toward improvement in processing, packaging, and distribution of products in order to be of greater service to consumers and livestock producers and to obtain better earnings.

The Leonard Hill Technical Group this month

Corrosion Technology.—Corrosion in the Food Industry; Corrosion in the Motor Car, 3: Protection of Chassis and Bodywork; Hot Dipped Aluminium Coatings; A Swedish Method of Counteracting Corrosion Damage to Engines; Corrosion in the Light of Recent Electronic Researches.

Manufacturing Chemist.—Friedel-Crafts Processes; Manufacture of Perfumery Chemicals, 1: Benzyl benzoate, Benzaldehyde and Coumarin; Bulgarian Rose Oil; Terpeneless Oils; Europe's booming Chemical Industry; New and Old Techniques in Tablet Coating; Progress Reports: Analytical Chemistry, Hormones, and Disinfectants.

Dairy Engineering. — The Cheese of Great Britain, 9: Dunlop; Dairy Plant Safety Problems; Milk Vitaminisation by Ultra Violet is Cheap and Simple; Agitation Banishes "Cooked Flavour" in a Novel Milk Steriliser; Northern Dairies' Southern Outpost.

Fibres.—Fibrous Minerals, 3: Mineral Wool; "Tailoring" Vinyl Copolymers to Produce Easily Dyeable Polyacrylonitrile Fibres; Pan — a New Synthetic Fibre from Western Germany; Reclaiming Fibre from Backwater in the Paper Mill; Fibre Data Sheet.

Chemical and Process Engineering. — Oxygen Scavenging of Boiler Feed Water; Mechanical Seals—A Survey of Present-day Practice; Separation of Volatile Materials by Gas-Liquid Chromatography; New Fatty Alcohols Factory in France; New Processes of Coal Treatment.

Paint Manufacture.—Preview of the O.C.C.A. Exhibition; The Use of *p*H in the Paint and Colour Industries; Thixotropy and Paints; Polyvinyl Acetate Synthesised in Great Britain.

Petroleum. — Instrumentation and Automatic Control in Oil Refineries, 3; Geophysical Methods of Oil Prospecting, 3; Explosive Limits in Aircraft Fuel Tanks.

Atomics. — The Handling of Radioactive Materials; Gamma-Radiography in Oil Installations, 3.

Building Materials Digest.—Recent Developments in the Use of Plywood for Building, 3; Towards Domestic Central Heating; Products for Builders.

OVERSEAS ENQUIRIES

Hong Kong: Canned foods, whisky and gin

Richard Hua and Co., 103, Victory House, Wyndham Street, Hong Kong, wish to represent U.K. manufacturers of Scotch whisky, gin, etc., and canned provision goods.

Manufacturers interested in this enquiry should write direct to the firm giving full details of their offers, quoting c.i.f. prices, and, at the same time, addressing copies of their initial correspondence to the U.K. Trade Commissioner, P.O. Box No. 528, Hong Kong, so that the enquiry may be pursued.

Canada: Toffees

Mr. Ormand R. Bailey, President of George Rogers and Co., 3277, Bloor Street West, Toronto, has told the U.K. Trade Commissioner at Toronto that he would like to get in touch with a U.K. manufacturer of medium-priced toffee packed in fancy tins for selling mainly in the Ontario tourist centres.

Mr. Bailey says that there would be quite a trade in medium-priced packaged toffee to sell at, say, $1/lb., which would mean being able to sell to the retailers at about $8 a dozen tins. He is anxious to get in touch with a suitable manufacturer as soon as possible.

George Rogers and Co. represent a number of U.K. firms for foodstuffs and confectionery and they are considered to be a suitable connection for British manufacturers.

Firms interested in this enquiry should write direct to Mr. Bailey with full details of their offers and c.i.f. prices quoted in Canadian dollars. It will be appreciated if at the same time they will notify the U.K. Trade Commissioner, 901-902, Montreal Trust Building, 67, Yonge Street, Toronto, that they have done so.

Food Packaging

Glass for food packaging

That the importance of glass as a packaging material is being emphasised by the growth of self-service was illustrated by an exhibition, "Glass for Self-Service," held in London recently by the Container Section of the Glass Manufacturers' Federation in conjunction with Parnall and Sons Ltd., suppliers of self-service equipment. Arranged in the form of a self-service store, for which Parnall and Sons Ltd. supplied the fittings, the exhibition demonstrated how glass helps to sell the product. A wide range of exhibits from members of the National Association of Soft Drinks Manufacturers, Food Manufacturers' Federation, Proprietary Association of Great Britain, The Brewers' Society, the Scotch Whisky Association, The Association of British Pharmaceutical Industry, The Wine and Spirit Association of Great Britain and The Toilet Preparations Federation Ltd. gave ample evidence that the visual sales appeal of glass containers is particularly forceful on the self-service counter. Items such as ox tongue, calves tongue, and chicken slices looked especially appetising, while products such as bottled turtle soup (ready to serve), herbs and other foods normally bought loose, have the advantage of handiness.

Other visual qualities of glass were emphasised by a wide range of translucent and opaque containers in various colours, the large variety of attractive shapes into which glass can be moulded and the facility of glass for labelling or embossing. In addition to the usual type of label, permanent enamelled labels can be affixed, and added appeal can be obtained by the design of cap or closure.

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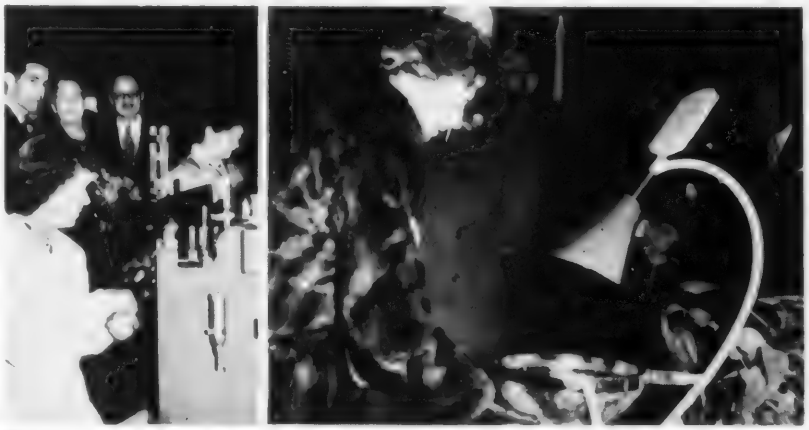
New Farex formula and pack

A new formula and pack for *Farex* have been introduced by Glaxo Laboratories Ltd. Protein-rich separated milk powder plus vitamins B_1 and B_2 have been added to the original blend of three cereals, minerals, and vitamin D. The extra vitamins are claimed to be present in amounts that meet a high proportion of a child's daily needs.

The carton has been re-designed for greater eye appeal. The background colour remains green, but plum red has been introduced for the name display. A red background draws attention to the weight content (10 oz.). The retail price remains unchanged at 1s. 4d.



ROYAL INTEREST IN PACKAGING. These photographs show H.R.H. The Princess Royal visiting two stands at the Packaging Exhibition. On the left she is seen watching a demonstration of "Newman" labelling machines on the stand of D. Trapow and Co. Ltd.; in the right hand picture she is inspecting a bowl made from a standard moisture-proof type of "Cellophane" demonstrating the water-proof properties of the "anchored" coating, on the stand of British Cellophane Ltd. Col. J. R. Harper of the company is on the extreme right.

New unit sausage pack

Clover Meats Ltd., of Waterford, Ireland, have improved the attractive film and card pack in which they have been retailing their high quality sausages for some time, with a resultant increase in eye-appeal for their products.

Twelve of the sausages (1 lb. weight) are held in two layers in a card packaging form with an overwrap of *Cellophane* cellulose film, moistureproof type. The film is attractively printed in bright green and red with an overall clover pattern and the firm's name and address. The card, previously a sleeve with a cut-out window, now takes the form of a straightforward tray and the transparent film is therefore used to far greater effect since the whole of the top layer of the contents is temptingly visible. The tray, too, gives more rigidity for handling purposes.

Presented in this handy form, kept absolutely clean and effectively branded, the products have met with wide acceptance in the U.K. where they are distributed by Armour and Co. Ltd., Smithfield.

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New labelling papers

Delayed Tack Heatseal Papers which have been extensively successfully developed in Canada and the U.S.A. for the packaging and labelling fields are now being produced in this country and are available from Samuel Jones and Co., who are the sole licensees for their manufacture in the U.K. Two heatseal papers are available, *Imatac* for instantaneous sealing and *Delatac* for delayed action, both being registered names.

A sample folder with full details of uses and methods of application is available from Samuel Jones and Co. Ltd.

Guinness's U.S. agreement

The Dublin firm of Arthur Guinness, Son and Co. Ltd. has concluded an agreement with the Goebel Brewing Company of Detroit, Michigan and Oaklands, California, for the production and sale in the U.S. of an ale and a lager beer to be called "Guinness Ale" and "Guinness Lager Beer."

The ale and lager will be marketed on a national scale in the U.S., but there will be a few pilot brews before production begins for sale. Two consignments of yeast from the Dublin brewery will be used to start the brew for the new drinks.

Guinness have also re-started exporting stout from Dublin to the U.S. This export had ceased when the company began to brew stout for the U.S. market in Long Island city in 1949. Last August, however, production ceased at the Long Island brewery. The stout will be shipped from Dublin to Liverpool where it will be bottled by Guinness Exports Ltd., a subsidiary of the parent company. It will then go direct to the U.S.

Trade Marks

APPLICATIONS

BIRD'S SUGAR CRISP.—714,146. Cereal breakfast foods having a coating predominantly of sugar, prepared for human use. **Alfred Bird and Sons, Ltd.**, Devonshire Works, Deritend, Birmingham, 12; Manufacturers and Merchants.

SPICEMANN'S.—717,523. Spices (other than spices for poultry), pepper, curry powder and seasonings. **Spicemanns, Ltd.**, Pepper Mills, Kelvin Avenue, Hillington, Glasgow, S.W.2; Manufacturers and Merchants.

CRESTA.—721,136. Nut oil for food. **The Peerless Refining Co. (Liverpool), Ltd.**, Dunnings Bridge Road, Liverpool, 10; Edible Oil and Lard Compound Refiners.

CLARITA.—722,282. Meat extract, condensed milk, cheese, jam, marmalade, prune paste, canned fish; preserved, dried and cooked fruits and vegetables; and edible oils, edible fats, pickles and canned meat. **C. and O. Produce Marketing Co., Ltd.**, Broad Street House, 54, Old Broad Street, London, E.C.2; Merchants.

LEM.—B723,260. Cooked, canned and preserved meats. **Oxo, Ltd.**, Thames House, Queen Street Place, London, E.C.4; Manufacturers

RIKO.—724,344. Preserved meat. **Karl Richard Riemer,** Mockernstrasse, 69, Berlin, S.W.61, Germany; Manufacturer.

CHOCOMEL.—B726,768. Beverages containing chocolate and milk, the chocolate predominating. **Ernest Marshall,** "Pejoda," Pittville Circus Road, Cheltenham, Gloucestershire; Manufacturer.

LYRIC.—726,990. Margarine and cooking fats. **A. J. Mills and Co., Ltd.**, Colonial House, Tooley Street, London, S.E.1; Merchants.

SILVER GLEAM.—727,160. Margarine. **Western Margarine, Ltd.**, Westfields Road, Acton, London, W.3; Manufacturers.

BON TON.—B728,177. Sauces. **Jonathan Lionel Percy Denny,** 9, Eastcheap, London, E.C.3, Produce Broker and Importer.

CRAX.—B728,687. Biscuits (other than biscuits for animals). **Meredith and Drew, Ltd.**, 339-377, The Highway, London, E.1; Manufacturers.

B.G.C.—B729,035. Dripping. **British Glues and Chemicals, Ltd.**, 96, Bridge Road East, Welwyn Garden City, Herts.; Merchants and Manufacturers.

STARLAC.—729,296. Milk and milk products (for food). **The Borden Co.** (a Corporation organised and existing under the laws of the State of New Jersey, U.S.A.) 350, Madison Avenue, City and State of New York, U.S.A.; Manufacturers.

CHILK.—729,530. Flavoured milk products for making drinks. **The Chocolate Milk Co., Ltd.**, 8 and 9, Great Pulteney Street, Piccadilly, London, W.1; Manufacturers and Merchants.

TANGOES.—730,594. Toffees; and non-medicated boiled sweets. **Welch and Sons, Ltd.**, Norham Road, West Chirton, North Shields, Northumberland; Manufacturing Confectioners.

REGINA.—B730,978. Milk and butter. **J. G. Ratner (Produce), Ltd.**, 44, Fish Street Hill, London, E.C.3; Merchants.

ALVA.—B731,077. Meat, fish (other than live fish), and canned and preserved fruits and vegetables. **Richard D. Dudley and Co., Ltd.**, 41, Eastcheap, London, E.C.3; Merchants.

ATILA.—731,078. Meat, edible oils, and edible fats. **Richard D. Dudley and Co., Ltd.**, 41, Eastcheap, London, E.C.3; Merchants.

PLAZA.—731,105. Biscuits (other than biscuits for animals), but not including chocolate biscuits. **Excelsior Biscuit Co., Ltd.**, 11, Old Jewry, London, E.C.2.

VANESSA.—731,112. Margarine. **A. A. Mont, Ltd.**, also trading as **Alpha Margarine Co.**, Brixham Road, Ayres Road, Old Trafford, Manchester, 16.

SONATA.—731,113. Non-medicated confectionery. **Chocolat Tobler, Ltd.**, 20, Soho Square, London, W.1; Manufacturers.

OMA.—731,133. Margarine. **Otto Mønsted A/S.** (a Company incorporated under the laws of Denmark), Otto Mønsted, Plads, 9, Copenhagen, Denmark; Manufacturers.

SWANSDOWN. — 731,147. Dried currants, sultanas, raisins, and mixtures of dried fruit. **Palatine Packing Co., Ltd.**, Atlantic Mills, Droylsden Road, Manchester, 10.

GOLDEN AGE.—731,156. Chocolates containing liqueurs. **John Gree and Company,** 88, Whitchurch Lane, Edgware, Middlesex; Wholesale Wine and Spirit Merchants.

JUBILEE.—731,298. Margarine. **Rutzou, Ltd.**, 44-46, Tooley Street, London, S.E.1; Merchants.

CARLO.—731,445. Canned, preserved, and cooked meats. **Frigorifico Nacional,** Piedras 357, Montevideo, Uruguay; Meat Packers.

STEWARDESS.—731,447. Edible oils and edible fats. **N.V. Batava Margarine Fabrieken,** Krayenhoffiaan 10, Nijmegen, Holland.

PINE ROSE.—731,531. Canned pineapple. **Trading and Agency Co.,** 3, Malacca Street, Singapore; Merchants.

FAIRLANDS.—731,540. Butter. **Elmbrook Creamery, Ltd.**, Gander Green Lane, Cheam, Surrey.

MELBA.—731,689. Jellies (for food). **Cielim, Ltd.**, 61, Wigginton Road, York.

BLACK ADDER. — 731,723. Confectionery (non-medicated). **Voile and Wortley, Ltd.**, 50, Bidborough Street, Judd Street, Euston Road, London, W.C.1.

SUNDOWN.—731,747. Butter. **Adams (Wholesale) Dairies, Ltd.**, Buxton Road, Leek, Staffordshire; Butter Importers, Blenders, and Packers.

DIPPINS.—731,850. Flour confectionery. **Henry Telfer, Ltd.**, Lerry House, Lillie Road, London, S.W.6; Merchants and Manufacturers.

LUCELLI.—731,969. Macaroni and spaghetti. **Crown Macaroni Company,** Cromac House, 8-22, Broadwater Road, Welwyn Garden City, Hertfordshire.

MALPINE.—731,977. Fruit, fish, meat, and vegetables, all being canned; and dried fruit. **Soteriades and Co., Ltd.**, 3, Lombard Street, London, E.C.3; Merchants.

CHOCOLENE.—732,007. Chocolate and non-medicated chocolate confectionery; **CHOCOLINE.**—732,008. Chocolate and non-medicated chocolate confectionery. **Van Houten, Ltd.**, Chesham, Buckinghamshire; Manufacturers and Merchants.

METEOR.—732,012. Sugar confectionery (not medicated) and eating chocolate. **Pražské Pecivárny, Národní Podnik** (a Corporation organised and existing under the laws of Czechoslovakia), Sokolovská 94, Prague X, Czechoslovakia; Manufacturers and Merchants.

BLACK SAM.—732,129. Non-medicated boiled sugar confectionery. **Nuttalls (Patamints), Ltd.**, 37/39, Henry Street, Blackpool; Sweet Manufacturers.

BREWVITE.—732,198. Yeast extract for use as food. **Barclay Perkins and Co., Ltd.**, The Brewery, Park Street, London, S.E.1; Brewers.

DOCON.—732,283. Substances used in the making of bread and other farinaceous baked foodstuffs for improving the quality and keeping properties thereof. **Allinsons Natural Food Products, Ltd.**, 24, Newman Street, London, W.1; Merchants.

BUNNY.—732,516. Butter, margarine and cooking fats. **Skerrybahn Dairies, Ltd.**, 49-53, Trafalgar Street, Belfast, Northern Ireland; Merchants.

GAY BOY.—732,606; **GAY DON.**—732,607; **GAY MAR.**—B732,608; **GAY PAL.**—732,609; **GAY PAN.**—732,610. Butter, margarine and cooking fats. **Skerrybahn Dairies, Ltd.**, 49-53, Trafalgar Street, Belfast, Northern Ireland; Merchants.

NEGRITA.—732,777. Currants. **John Gregory Gregoropoulo and Nico Gregory Gregoropoulo,** trading as **J. Gregoropoulo and Co.**, 90, Michel Voda Street, Athens, Greece; Merchants.

FRAM.—732,789. Shell eggs produced in the United Kingdom. **Framlingham and Eastern Counties Co-operative Egg and Poultry Society, Ltd.**, Burrell Road, Ipswich, Suffolk; Licensed Egg Packers and Wholesalers.

TRAFALGAR.—B732,857. Meat, fish (other than live fish), preserved fruits and preserved vegetables. **B. J. Borges Limitada** (a Joint Stock Company organised under the laws of Portugal), Travessa do Giestal 2, Lisbon, Portugal; Manufacturers and Merchants.

JOLLY JUMBO.—732,983. Jam, marmalade, lemon curd and mincemeat. **Spring and Co., Ltd.**, Riverside, Brigg, Lincolnshire; Merchants.

ASCORBAMIN.—733,033. Substances containing vitamin C used in the making of bread and other farinaceous baked foodstuffs for improving the quality and keeping properties thereof. **Novadel, Ltd.**, 10, Buckingham Palace Road, London, S.W.1; Manufacturers.

WATER MILL.—733,055. Edible oils and edible fats. **London Grocers, Ltd.**, 11, Dod Street, London, E.14; Merchants.

LOOKIES. — 733,060. Non-medicated sugar confectionery. **Batger and Co., Ltd.**, 566, Cable Street, Stepney, London, E.1; Manufacturers.

BLUE SHIELD.—733,194. Dried fruit; **BLUE TULIP.**—733,195. Dried currants. **Rawmat Co., Ltd.**, Library Chambers, 13-14, Basinghall Street, London, E.C.2; Merchants.

LILLIDALE.—B733,241. Edible fats, edible oils, cheese, eggs, preserved and dried fruits, bacon, cooked meats and canned foods. **Quickset Products, Ltd.**, "Curshaw House," 166/172, Tooley Street, London, S.E.1; Wholesale Grocers, Provision Merchants and Food Manufacturers.

Information and Advice

This Service is available to subscribers to Food Manufacture. If a stamped addressed envelope is enclosed replies will be sent by post, but enquiries cannot be answered by telephone.

Declaration of ingredients

B.7359. *Does sausage seasoning composed of various spices and salt have to have the name of the various ingredients printed on the label?* (Tankerton, Kent)

Provided the product is sold only to food manufacturers and is not, therefore, sold by retail or displayed for sale retail, we are unaware of any legal obligation to declare on the pack the ingredients of the product.

Vegetarian jelly crystals

B.7320. *We are considering manufacturing a line of jelly crystals for strict vegetarians which, of course, must not contain any gelatine. We have made some experiments with agar-agar, both from local and New Zealand sources, but these have not been satisfactory. Please advise us of a formula to fill the bill.* (Sydney, N.S.W.)

Agar-agar will not crystallise and consequently cannot be used for jelly crystals. If you use a large proportion of sugar to agar, so that the sugar crystallises, you might get better results.

As the basis for experimentation, here is a formula for a jelly powder based on agar-agar:

U.S. Patent 1,974,474.

Powdered agar-agar	$\frac{1}{16}$ oz.
Sugar	$1\frac{3}{4}$ oz.
Tartaric acid	$\frac{1}{16}$ oz.
Sodium bicarbonate	3 g.

The above forms a stiff jelly with 8 oz. water.

Orange drink preservatives

B.7353. *I am manufacturing a fresh orange drink. The life of this in concentrate form is about three weeks. I am not adding any preservative, but would like details of what I could add to this so that I may offer my product to hotels and shop trades. What would be the estimated life of the drink when preservative is added?* (Blackpool)

A concentrated orange drink needs preservation either with 350 p.p.m. of sulphur dioxide or 600 p.p.m. of benzoic acid in order to give it reasonable stability over a period of several months. It is a fallacy to suppose that smaller amounts of preservative will keep the juice for relatively shorter periods. A concentrated product designed for a storage life of only a few weeks should have the full amount of preservative. Opinions in the trade differ as to which preservative is the better. The sulphur dioxide is added as a salt, potassium metabisulphite, and the benzoic acid as sodium benzoate.

Both these preservatives are controlled under the Food and Drugs Act and the preservative regulations of the Ministry of Food, and the quantities must not exceed those laid down.

Information supplied

The Enquiry Service has dealt with requests for the names of manufacturers and suppliers of plant, machinery and materials and also general information as follows:

B.7341. *Manufacturers of "Cellophane" wrappings.* (Sussex)
B.7343. *Suppliers of chewing gum base.* (Switzerland)
B.7344. *Equipment for making syrups, etc.* (Karachi)
B.7346. *Growing and canning of mushrooms.* (Cape Town)
B.7347. *Effervescent fruit drink formula.* (Liverpool)
B.7348. *Heating jam with steam.* (Birkenhead)
B.7350. *Manufacturers of dried egg.* (Cardiff)
B.7351. *Manufacturing process for candied peel.* (Derby)
B.7352. *Pump for starch-filled confections.* (Cleckheaton)
B.7353. *Preservative for an orange drink.* (Blackpool)
B.7354. *Machine for extrusion of breakfast cereal.* (Kent)
B.7356. *Makers of coffee extract installations.* (Gröningen)
B.7357. *Decolorisation of edible fats.* (Wiltshire)
B.7359. *Labelling requirements for sausage seasoning.* (Kent)
B.7360. *Literature on coconut oil extraction.* (Bombay)
B.7361. *Freezing concentration of apple juice.* (Milan)
B.7362. *Makers of waxed cup making plant.* (West Bromwich)
B.7363. *Production of egg products.* (Holland)
B.7364. *Machinery for roasting, grinding, etc., coffee.* (Malta)
B.7366. *Preparation of diabetic jams.* (London)
B.7367. *Manufacture of soya bean coffee essence.* (Victoria, Australia)
B.7368. *Suppliers of liquid egg machine.* (London)
B.7369. *Equipment for preparing macaroni rice.* (Henley-on-Thames)
B.7370. *Method of preparing vanilla sugar.* (Bombay)
B.7371. *Suppliers of silverskin onions, etc.* (Dublin)
B.7372. *Recipe for liquorice pipes.* (Co. Cavan)
B.7374. *Machine for removing blackcurrant strigs.* (Cork)
B.7375. *Manufacturers of industrial vacuum cleaners.* (Bradford)
B.7376. *Suppliers of invertase.* (Wigan)
B.7377. *Recipe for creamed mushroom pack.* (Kidderminster)
B.7378. *Manufacture of dog rusks.* (Haltwhistle)
B.7379. *Mixing machinery for seasonings.* (Accrington)
B.7380. *Methods and machinery for potato crisp manufacture.* (London)
B.7381. *Almond oil extractors and nut millers.* (Dublin)
B.7382. *Manufacturers of polystyrene containers.* (Chesterfield)
B.7383. *Suppliers of monosodium glutamate.* (Slough)
B.7384. *Hydraulic presses for fruit juices.* (Spalding)
B.7385. *Formula for synthetic bakery cream.* (Smethwick)
B.7386. *Manufacture of tomato juice.* (London)
B.7387. *Machines for silk screen printing labels.* (Manchester)

New Companies

Avana Holdings, Ltd. Bakers, confectioners, etc. £5,000. Subs.: J. S. Hodge, White Lodge, Ty Gwyn Avenue, Penylan, Cardiff (acct.) and J. R. Taylor.

Harnell, Ltd. 106, High Street, Southend-on-Sea. Manufacturers of and dealers in sausages, cooked meats, etc. £500. Dirs.: L. E. Hart and J. S. Harris.

K. J. Hovers and Co., Ltd. 328, Birmingham Road, Sutton Coldfield. Packers, canners, and preservers of foodstuffs, etc. £1,000. Dirs.: K. J. and Patricia Hovers.

Skinless Sausage Co., Ltd. 9, Cavendish Square, London, W.1. £100. Dir.: J. H. Grove.

Sussex Meats, Ltd. 14, Goldstone Street, Hove. Manufacturers, processors, and packers of food, etc. £3,000. Dirs.: H. E., R. L., and R. J. Cresswell.

Carrsides Dairies, Ltd. 95, North Road, Darlington. To take over the business of a milk distributor carried on at Darlington by T. E. Wilkinson. £10,000. Permt. dirs.: T. E. and W. N. Wilkinson.

Wilkinson and Bowen, Ltd. 8, Winchcombe Street, Cheltenham. Manufacturers of and dealers in chocolate, sweets, etc. £3,000. Dirs.: A. C. and K. Wilkinson, and M. Bowen.

Greco's Biscuits, Ltd. 11a, Grimston Street, Leeds, 9. £1,000. Dirs.: A. and J. Greco.

Smethwick Home Killed Meat Co, Ltd. Barclays Bank Chambers, South Road, Smethwick, Staffs. £1,000. Dirs.: A. H. Broadhurst, F. G. Crees, A. Lightwood, E. G. Powter, and three others.

Solstice Food Products, Ltd. 50, High Street, Amesbury, Wilts. Bacon curers, etc. £2,000. Permt. dirs.: R. C. Tambling and J. Denton.

Aberayon Meat Products, Ltd. 31.12.54. 49, Queen Street, Blackpool. £100. Dirs.: I. G. and Mrs. A. M. Evans.

Ashton-under-Lyne Wholesale Grocers, Ltd. 1.1.55. Peira Cava, Eskdale Avenue, Woodley, Ches. £1,000. Dirs.: C. Ashworth, J. F. Cross, F. Short, K. Sorby, H. G. Smith, C. L. Warne and F. Wilde.

Belfields (Lancashire Bakeries), Ltd., 31.11.54. 1, Grange Parade, Uxbridge Road, Hayes, Mdx. £2,000. Permt. dirs.: J. W. and Mrs. A. Belfield.

Belmont and Co. (Leeds), Ltd. 23.12.54. 71, Street Lane, Leeds, 7. Cooks, caterers, bakers, etc. £5,000. Dirs.: to be apptd. by subs. Subs.: C. Belmont and W. Dixon.

Bronte Brand (Sweets), Ltd. 1.1.55. Mansfield Road, Manningham, Bradford. Mnfrs., wholesalers and retailers of confectionery, etc. £500. Dirs.: J. and S. A. Lister, and T. C. W. Cooper.

Buntingford and District Egg Marketing Co., Ltd. 31.12.54. Bewlay, Slip End, Baldock, Herts. £2,500. Permt. dirs.: E. and Mrs. V. J. Godfrey.

Chilton Thompson (London), Ltd. 1.1.55. 23, Blomfield Street, London, E.C.2. Importers and exporters of and agents for canned, dried, frozen and fresh fruit and food of all kinds, etc. £1,000. Dirs.: not named. Subs.: J. H. Thomlinson and L. Blackie.

M. L. Collier and Sons, Ltd. 5.1.55. 14, South Bank Road, Cargo Fleet, Middlesbrough. To take over bus. of dairymen and dlrs. in dairy produce carried on at Middlesbrough as "M. L. Collier and Sons." £5,000. Dirs.: Mrs. M. L., J. and R. Collier.

G. F. Faint, Ltd. 10.1.55. 103, Brook Cottage, Flamstead End, Cheshunt, Herts. Raisers, growers, and sellers of and dlrs. in fruit, corn, cereal, etc. £10,000. Dirs.: G. F., J., P. and Mrs. M. E. Faint, and Mrs. J. Clarke.

Fine Food Products, Ltd. 21.12.54. 13, Chalton Street, London, N.W.1. £100. Mnfrs. of and dlrs. in sweets, confectionery, etc. Dirs.: E. J. Black and B. D. Float.

A. Fisher (Eggs), Ltd. 8.1.55. Islington Mill, James Street, Salford, 3. Importers, exporters, buyers, sellers and dlrs. in eggs, etc. £2,000. Dirs.: A. and Mrs. E. Fischoff.

Hemmings Metier Co. Ltd. 23.12.54. 18, John Street, London, W.C.1. Mnfrs., preservers and canners of and dlrs. in essences, conserves, table delicacies, etc. £1,000. Dirs.: W. A. and Mrs. E. M. Hemmings and J. D. Jones.

Homely-Faro, Ltd. 22.12.54. 13, Blackett Street, Newcastle-on-Tyne, 1. Mnfrs. of meat and fish preparations and delicacies, etc. £1,000. Dirs.: J. Daly, G. Ross and L. F. Lawson.

Ken Tea Co., Ltd. 6.1.55. 15, Greenwich Church Street, London, S.E.10. £100. Dirs.: A. and Mrs. D. Bass, and K. Dean.

Allan Leigh (Farm Fresh Eggs), Ltd. 8.1.55. Packing Station, Lea Road, Lea, nr. Preston, Lancs. To take over bus. of "Allan Leigh Farm Egg Packing Station" now carried on by Allan and Mrs. C. Leigh, etc. £100. Dirs.: A. and Mrs. C. Leigh.

I. Manns, Ltd. 5.1.55. Old Post Office Buildings, Porth, Glam. Mnfrs. of and dlrs. in confectionery, etc. £2,000. Dirs.: I. and H. Manns.

F. V. Miller, Ltd. 24.12.54. 334, Radford Road, Nottingham. Pork butchers, bacon curers, factors and mchts., etc. £500. Dirs.: F. V. and Mrs. H. L. Miller.

Munroe's (Blackburn), Ltd. 5.1.55. 2, Johnston Street, Blackburn. To take over bus. of bakers and confectioners carried on at 44, Darwen Street, Market Hall, and 16, Oswald Street, Blackburn, as "Munroe's." £1,000. Dirs.: F. Munroe, E. and Mrs. E. Houghton.

Palmers Yeast, Ltd. 6.1.55. 7/8, Bury Court, St. Mary Axe, London, E.C.3. Mnfrs. of and dlrs. in yeast and other bakers' supplies, etc. £1,000. Dirs.: A. E., J. A. L. and F. G. Palmer.

Patimex (England), Ltd. 31.12.54. 33, King Street, London, E.C.2. Preservers, bottlers, canners and mnfrs. of and dlrs. in articles of food and drink, to develop and exploit processes for the preservation and sterilisation of milk, butter, ice cream, etc. £100. Dirs.: P. M. Colvin-Smith, G. W. Russell and J. M. W. North.

Pattingham Wholesale Meat and Farming Co., Ltd. 5.1.55. Great Moor Farm, Pattingham, Staffs. Market gardeners, nurserymen, dairy, poultry and genl. farmers, etc. £20,000. Dirs.: H. E. Jones, F. C. Lee, W. Bolland, F. C. Spicer, J. and F. Moseley.

Peers Export, Ltd. 10.1.55. 84/86, Broadway, Cardiff. Exporters, importers and mnfrs. of and dlrs. in merchandise, foodstuffs, etc. £500. Dirs.: L. E. Davies, A. K. Brown, V. M. Hughes and M. C. Davies.

R. L. Porter and Son, Ltd. 1.1.55. Sunniside Chambers, St. Thomas Street, Sunderland. Mnfrs. of and dlrs. in confectionery, chocolates, etc. £20,000. Dirs.: R. Porter and G. Gilchrist.

L. W. Runchman, Ltd. 21.12.54. 276, Leven Road, London, E.14. Mnfrs. of and dlrs in sweets, confectioneries, edible nuts, chocolate, etc. £5,000. Dirs.: L. W. and E. D. Runchman.

Sanderson's of Cheadle, Ltd. 8.1.55. 4, Wood Street, Cheadle, Ches. Mnfrs. of and dlrs. in chocolates, sweets, confectioneries, etc. £1,000. Dirs.: F. W. Sanders, N. Glover and T. Johnson.

Spalding Bakeries, Ltd. 29.12.54. Kingsway Hall, Kingsway, London, W.C.2. £1,000. Dirs.: E. T. Green and N. Sharples.

Stanley Bridges, Ltd. 1.1.55. Long Causeway Chambers, Peterborough. Raisers, growers, mchts. of and dlrs. in fruit and vegetables, etc. £1,000. Dirs.: S. and Mrs. I. M. Bridges.

Van Melle, Ltd. 1.1.55. Mnfrs. of and dlrs. in biscuits, wafers, cakes, chocolate, toffee, sweets and confectionery, etc. Dirs.: to be apptd. by subs. Subs.: D. A. Clarke and H. S. Martin.

Veraken, Ltd. 8.1.55. Bakers, caterers, etc. £100. Dirs.: K. R. and Mrs. V. Christopher, 274, Holmesdale Road, London, S.E.25.

James Watkiss, Ltd. 24.12.54. 414, Bearwood Road, Smethwick, 41. To take over bus. of a slaughterman, bacon curer and pork butcher carried on as "James Watkiss" at 55/56, High Street, and at 12, Hall Street, Dudley. £40,000. Dirs.: J. C. and Mrs. L. M. Watkiss.

T.-H. and West Penwith Meat Co., Ltd. 31.12.54. Tallyho, Madron, nr. Penzance. £6,000. Dirs.: T. H. Tonkin, J. S. Rodda and L. Polglase.

Westrow Mushroom Farm, Ltd. 7.1.55. 25, Chesham Road, Amersham, Bucks. £1,000. Dirs.: J. F. and Mrs. D. B. Wege, and G. R. D. Newell.

Wycombe Confectionery Co., Ltd. 5.1.55. 26/27, Conduit Street, London, W.1. £5,000. Dir.: J. S. Rowntree.

Brays (Cardiff), Ltd. 14.1.55. Factory, Dale Avenue, Birchgrove, Cardiff. Mnfrs. of and dlrs. in confectionery, chocolates, sweets, ices, etc. £5,000. Dirs.: T. V., P. M. and T. A. Bray.

Clares Chocolates, Ltd. 17.1.55. 1/3, Park Road, St. Marylebone, London, N.W.1. £100. Permt. dirs.: H. Gee and C. F. A. Fordham.

G. F. Hunt (Liverpool), Ltd. 11.1.55. 26, Exchange Street East, Liverpool, 2. Mnfrs. of and dlrs. in chocolate, sweets, sugar and flour confectionery, biscuits, etc. £10,000. Dirs.: A. W. Fletcher and H. Glover.

Jesse Oldfield, Ltd. 12.1.55. Heddwys, Chester Road, Mere, nr. Knutsford, Ches. Bakers, confectioners, pastrycooks, biscuit mnfrs., etc. £1,000. Dirs.: J. B. and E. Oldfield.

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Recent Patents

COMPLETE SPECIFICATIONS ACCEPTED

720,504. Baker Perkins, Ltd.: Baking ovens.
720,565. Wright's Biscuits, Ltd.: Method of, and apparatus for, handling biscuits.
720,755. Sunbeam Corporation: Combined waffle maker and sandwich grill.
721,057. Jewell, P. S., and King, J. G. T.: Production of ingredients for foodstuffs.
721,322. Stork and Co.'s Apparatenfabriek N.V., Geb.: Sterilisation of foodstuffs packed in containers.
721,493. Swift and Co.: Modified lard and process of making same.
721,581. Porteus, G.: Apparatus for the aeration of barley and like cereals.
721,685. Pelkman Bros., Ltd.: Baker's ovens.
721,754. Turner, R.: Means for cutting ice cream or other strips.
722,020. Crosfield and Sons, Ltd., J.: Cleaning of apparatus for treating milk and milk products.
722,195. Jones, T. M.: Fresh pea cleaning and washing-machines.
722,211. General Foods Corporation: Extraction of gelatin.
722,333. Knoch, H.: Quick-cooking cereal or farinaceous food products.
722,624. Gibbons, J. S.: Machine for grading fruit and other articles.
722,640. Haywood, G. J.: Egg lifter.
722,680. Oertli A/G., T.: Vegetable-dressing machine, especially for peeling potatoes.
722,737. Stokkebyes Kvarnsktiebolag., P. O.: Cereal gruels and the like.
722,760. Quaker Oats Co.: Machine for treating cereals or the like.
722,851. Webster, W. P., and Page, A. C.: Decorating or ornamenting of biscuits.
724,437. Record Bakery Equipment Co., Ltd.: Bread-slicing machines.
724,482. Oakes Corporation, E. T.: Method of and apparatus for smoothing tappings on biscuits, cakes and the like.
724,549. Eskimo Pie Corporation: Apparatus for making frozen confections.
724,891. Veenhuizen, H. A., and Veenhuizen, H. J.: Manually-operated peeling machine for potatoes, carrots and the like.
724,922. Svenska Turbinfabrike A/B Ljungström: Apparatus for storing fruit and vegetables.
724,966. Strathmeyer, W.: Process of enriching yeast with therapeutically acting substances.
725,127. Andrews, D.: Fish-washing machines.
725,160. Jongeneel, A. M.: Beet harvesters.
725,262. Miag Muehlenbau und Industrie Ges.: Milling machines.
725,278. Peters, L.: Packaging process for food and package produced thereby.
725,414. Jenkins, C. H. W.: Fixtures for supporting milling and like cutters during grinding.
725,532. Ahner, A.: Coffee mills.
725,622. Manbre and Garton, Ltd., and Berry, A. E.: Manufacture of food products containing cereal proteins.
725,632. De-Raef Corporation: Continuous ice cream freezer and method of making ice cream.
725,781. Gainers, Ltd.: Method of and apparatus for treating sausages.
725,839. Allen, J. J. C.: Machine for grinding and/or masticating vegetable materials.
725,981. General Foods Corporation: Starch-acid food product.
726,098. Johnson, J. H., Johnson, H. K., and Johnson, B. B.: Food packs.
726,138. Toth, J.: Device for separating the shell parts and the kernel parts of cocoa beans.
726,440. Liston, S.: Means for de-panning loaves of bread and the like.
726,460. Hoover, Ltd.: Food mixers.
726,549. Eskimo Pie Corporation: Machine for manufacturing frozen confections.
726,643. Kay, W. E., and Kay, A. W.: Machine for preparing potatoes and similar vegetables by washing and peeling.
726,772. Lensburg, H. C., and Munz, E.: Can sterilising apparatus.
726,822. Food Machinery and Chemical Corporation: Method of preparing evaporated milk and like products for preservation in sealed containers.
726,953. Jennings, G. M.: Process for the preservation of liquid or semi-solid foodstuffs.

ABSTRACTS OF BRITISH PATENTS

Silicone-coated bread pans

This invention relates to pans for use in baking bread or other bakery products and to a method of baking bread. Hitherto, bread pans have commonly been made of sheet steel and have been coated on the interior with grease or fat to prepare them for baking purposes. It has also been proposed to coat bread pans on the interior with an organosiloxane resin of a particular constitution.

One of the objects of this invention is to provide a bread pan in which the interior coating has an exceptionally long life. The bread pan has an aluminium interior, the interior cooking faces consisting of a surface layer of artificially formed aluminium oxide and a dough-mix contacting coating of an organosiloxane resin on the surface layer. The invention also provides a method of preparing for the baking of bread a bread pan having an aluminium interior, the method comprising forming a layer of aluminium oxide on the aluminium interior surfaces, and coating this layer with an organosiloxane resin.

Further, the present invention provides a method of preparing a bread pan and baking bread therein which comprises forming a layer of aluminium oxide on the interior surfaces of a bread pan having an aluminium interior, coating the layer with an organosiloxane resin, and repeatedly baking bread in the pan with the bread in contact with the resin during baking, whereby release of the bread from the pan is repeatedly obtained without the use of grease and without renewal of the resin coating. Another method of baking bread provided by the invention comprises baking the bread in contact with a film of an organosiloxane resin which coats a layer of aluminium oxide formed on an aluminium support, whereby release of the bread baked on the supported film is repeatedly obtained without the use of grease.

Preferably the whole body of the pan is formed of aluminium, and the pan, at least on the exterior, is of dark colour and matt, rough or unpolished so as to have high heat absorbing qualities.

It has been found by experiment that bread baked in a pan of dark and unpolished construction has a substantially uniform colouring all over which may be due to the fact that the greater heat conductivity and heat absorptive capacity of the pan sides causes more uniform application of heat to the bread; hitherto there has been a tendency for the top of the bread to become brown more quickly than the sides, the top being in contact with the circulating hot air in the oven. Furthermore, the smooth shiny pan interior formed by the resin gives the bread a glossy smooth external appearance which is desirable. The resin coating makes the use of fat or grease unnecessary.

It has also been found that bread baked in pans in accordance with the invention is very easily released or removed, due partly to the resin coating, and, it is believed, to the greater heat conductivity of the pan walls which causes earlier crusting and therefore greater ultimate shrinkage of the sides of the bread away from the walls; this is believed to be a factor in saving wear on the resin surface of the pan. Moreover, when the pans are embodied in mechanical plant used in the mass production of bread and embodying an automatic tipping device for the pans, the bread falls out of the pans instantly on tipping, so that striking and shaking of the pans to effect removal of the bread is avoided.—719,383. *J. R. Dalrymple* (*Pullman Pans Ltd., Edinburgh*).

Tempering liquid chocolate

The invention relates to apparatus for tempering chocolate, and more particularly chocolate required for coating bodies. It is well known that chocolate has to be tempered before solidification by a process of stirring and cooling the liquid chocolate for an appreciable period, which may vary from a few seconds to as much as 4 hr., according to the nature of the particular chocolate and the intensity of the stirring and cooling procedure applied to it. Untempered choco-

late can be tempered by mixing it into a quantity of already tempered chocolate, provided that the addition of untempered chocolate is made slowly and that the quanity of untempered chocolate so added is small by comparison with the quantity of already tempered chocolate to which it is added. If the untempered chocolate is pre-cooled to a fixed temperature, which is usually selected from the range of 95° to 105°F., a greater quantity of untempered chocolate can become tempered in this fashion, relative to the bulk of already tempered chocolate, than if the untempered chocolate is admixed at an uncontrolled or varying temperature.

The invention comprises a batch tempering machine combined with a thermostatically controlled continuous cooler. This continuous cooler is also used to accelerate the operation of batch tempering so that the tempering operation is completed more quickly than with the normal kettle type of batch tempering machine.

A batch of chocolate is fully tempered on this machine by the well-known cooling and stirring technique, which varies according to the type of chocolate being treated, but which is usually effected by cooling with stirring to a selected temperature between the limits of 84° and 94°F. When it has become fully tempered, this batch of chocolate is emptied rapidly into the storage hopper of the machine which is to use the chocolate, such as a chocolate depositor or chocolate enrober of known type, and the tempering machine is then recharged with untempered chocolate and re-adjusted to continue operation as a thermostatically controlled continuously operating precooler, drip feeding untempered but precooled chocolate into the already tempered batch of chocolate in the hopper of the using machine.

The invention also includes means for initially warming up the batch hopper and cooler, and a pump for accelerating the circulation of water through the jacketed system under thermostatic control.—719,520. *J. Alan Goddard Ltd.*

Vacuum apparatus for elevating milk

This invention relates to vacuum apparatus for elevating liquids, and is particularly concerned with apparatus for raising warm milk from churns so that it may be allowed to flow by gravity through a cooling device. It is also an object of the invention to dispense with the need for floats in the liquid containers, thereby reducing the number of parts to be cleaned and lessening the cost of elevating the liquid.

According to the invention, apparatus for elevating milk and other liquids comprises a receiver for the liquid elevated, a pipe connecting the receiver to a container from which the liquid is elevated, the pipe extending substantially to the bottom of the container, a flow control valve fitted in the base of the receiver, and means for applying vacuum to the receiver sufficient to cause the liquid to pass up from the container into the receiver and to lift and maintain the flow control valve in the closed position, whereby when the level of the liquid in the container falls below the outlet of the pipe, the vacuum in the receiver is broken via the pipe, the control valve opens, and liquid flows from the receiver.

The extent to which the outlet is opened when the vacuum in the receiver is broken may be varied in order to vary the rate at which liquid leaves the receiver.

When the apparatus is to be used for elevating milk, the vacuum may conveniently be applied to the receiver from the vacuum line of a vacuum milking machine and in this case means may be provided to ensure that the connection to the vacuum line is cut off when the vacuum in the receiver is broken. A rotatable valve in the pipe connecting the receiver to the vacuum line is normally held in the open position by the vacuum in the pipe but closes automatically when the vacuum is broken. Means may also be provided to ensure that excessive overflow of liquid from the receiver in the vacuum line is prevented, and these means may consist of a constriction valve in the vacuum line which is adapted to set up a back pressure to effect closing of the valve.—718,621. *F. H. Rutter and H. Aldersey.*

Sausages with double skins

The manufacture of sausages, of which the meat product or meat-containing foodstuff, is enveloped in an ordinary skin (natural or artificial) is generally known, as well as the fact that they dry up. This drying-up involves a loss of weight, and also of value and quality. By virtue of its ample fat content, the fat rectum of the pig is the natural gut which is most impervious to moisture, this being the reason why foodstuffs keep fresh inside it for a longer time. However, its cost is high and its section very irregular. Sausages encased in it are deficient in appearance and still dry out too fast.

Meat foodstuffs such as liver-paste are being sold in pots. When the pots have been filled, the upper surface of this paste which comes to lie under the lid, is covered with a layer of fat or lard, in order to prevent the paste drying out on this surface. The other surfaces (sides) of the block of paste are protected against drying by the walls of the pot. This procedure requires a lot of time and the pots are expensive. A considerable amount of them get broken during the successive operations of filling, closing, boiling, opening, transport, return-transit and cleaning.

It would also be possible to use a layer of fat or lard as outside envelope for a sausage, but such an envelope would not only be weak, but also very unhygienic, considering that the sausages have to be transported, kept in stock, manipulated and exhibited, to which is to be added the fact that the greasy touch would be disagreeably felt during handling. Sausages contained in such cases could not be boiled because they would disintegrate; this difficulty could only be solved by making use of closed forms, or similar devices for boiling the foodstuff which would then have to be taken out again and repacked, all of which would not eliminate these drawbacks. In any case, such procedure would entail considerable work, besides being unhygienic and unpractical.

These disadvantages can be prevented for the greater part by inserting a fat containing skin (casing, tube, layer, wrapping, envelope and the like) between the ordinary skin and the meat product or meat-containing foodstuff. Consequently, the fat containing skin envelopes the meat and the ordinary skin envelopes the fat containing skin.

In this description the term "ordinary skin" indicates those kinds of skins completely or partly composed of natural, or of an artificial skin which are used to pack the usual sausages (e.g. animal intestines, sausage casings formed from animal intestines, etc.; tubes of regenerated cellulose, chlorinated rubber, polyvinylidine chloride, impregnated fibrous base with resins, etc.; varnished or coated tubes from regenerated cellulose, etc.; double or more-walled casing made from animal intestines, etc.).

The term "skin of fat" means each skin, which may be completely or partly composed of fat, not including animal intestines, and which must be able to be made into a strip (slice or slab) which can for instance be hung up, folded, curved, rumpled, undulated, shifted. There is thus no question of using only "pure fat," but some substance which will, together with the "pure fat," give the necessary consistency to the strip (slice or slab).—719,270. *P. V. Vanreusel.*

ABSTRACTS OF FOREIGN PATENTS

Caffeine from dried kola nuts

The usual process of preparing caffeine by extracting dried and ground kola nuts with water is improved by saccharifying the contained starch before the extraction step by means of enzymes, particularly malt enzymes. The enzyme poison in kola nuts which inhibits the saccharifying action of malt enzymes is decomposed (or flocculated) by boiling the nuts in an aqueous medium.

The enzymes are added in portions at different temperatures. Thus, 600 kg. nut powder is added to 3,000 litres water at 35° and digested for some hours. The temperature is gradually raised to 35°-60° and 25 kg. crushed malt is added. The nut mash is, after ½ hr. at 60°, boiled for 1 hr., cooled at 85°, and 75 kg. crushed malt added. After 1 hr. at 85°, the mash is cooled at 65°, 100 kg. crushed malt is added, the mixture kept for 1 hr. at 65°, then heated at 70° and kept at 72° until the KI-starch paper test is negative.

The mash is filtered or centrifuged and evaporated to give a syrupy mass or crumbly paste suitable for the preparation of beverages, sweets, food supplements, or pharmaceuticals. — German 907,055. *Hildebrand Kakao und Schokoladen Fabrik. G.m.b.H.*

Grapefruit juice concentrate

Grapefruit juice (10 kg.) is treated with buffering acid and salt, *e.g.* malic acid 8·68, potassium malate 11·52, citric acid 98·9, sodium citrate, 40·5, potassium acid tartrate 12·5, succinate acid 12·76, and sodium acid succinate 15·14 g.

The water is separated by freezing, and the solution concentrated to obtain an extract containing 44·9% water. The extract is mixed with 20 g. *l*-ascorbic acid.—Japanese 1,525. *Tetsuo Misumi.*—Through *Chem. Abstracts.*

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In ages past, man's tools were simple and sturdy. But now the devices he needs are often fine and delicate and of an infinite complexity. For whereas the Neolithic flint-knapper, setting forth to trade, merely slung the requisite number of axe-heads into a skin bag, our modern manufacturer requires some stouter protection for his detergents and his television sets.

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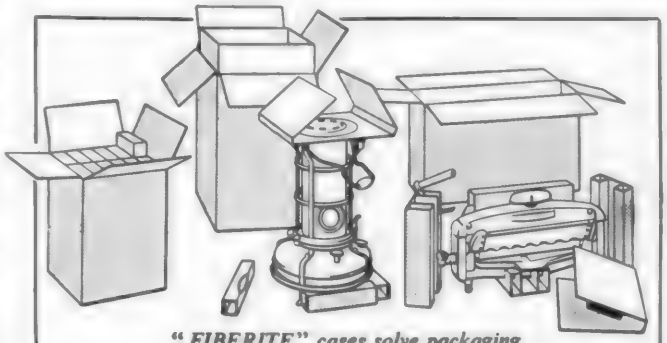

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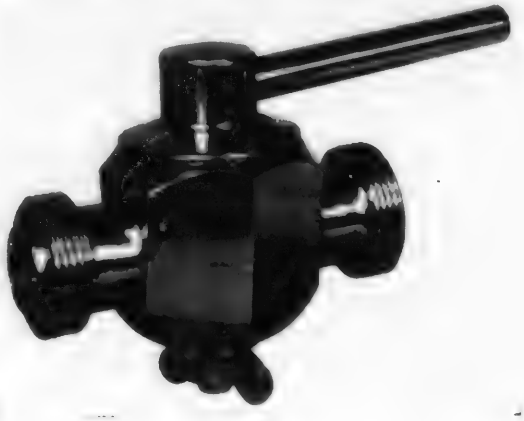

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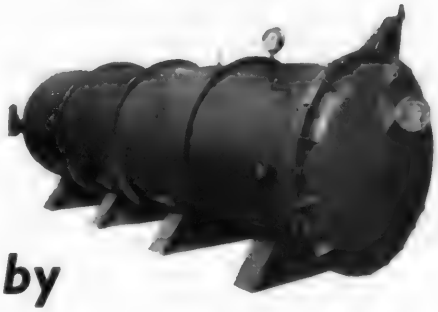

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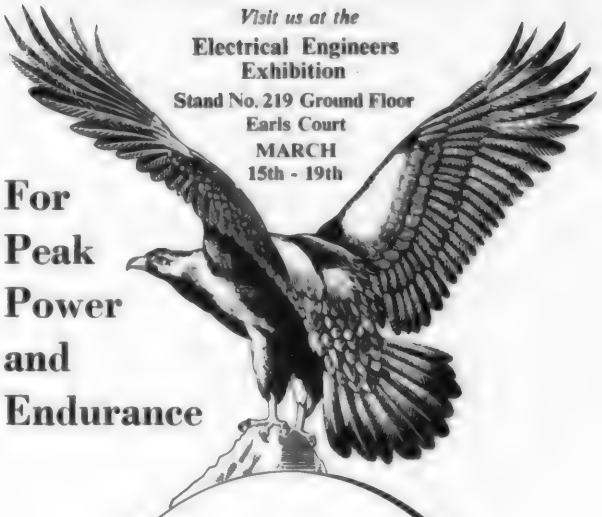

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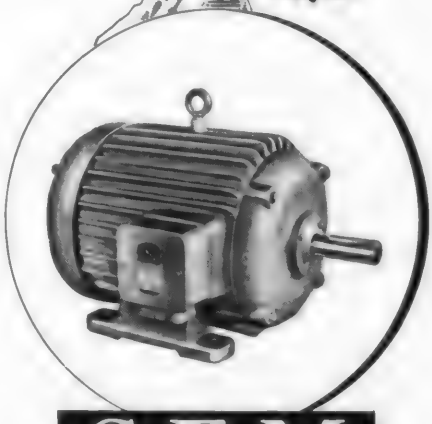

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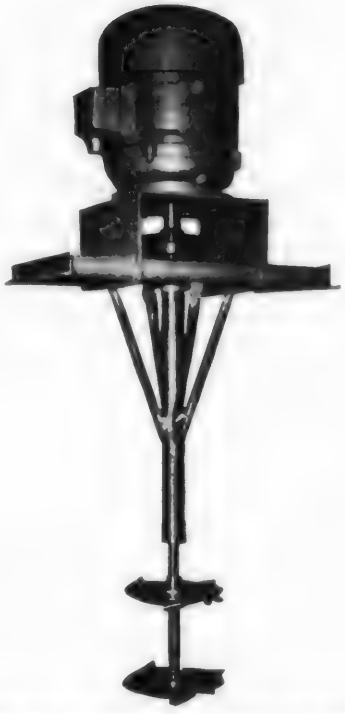

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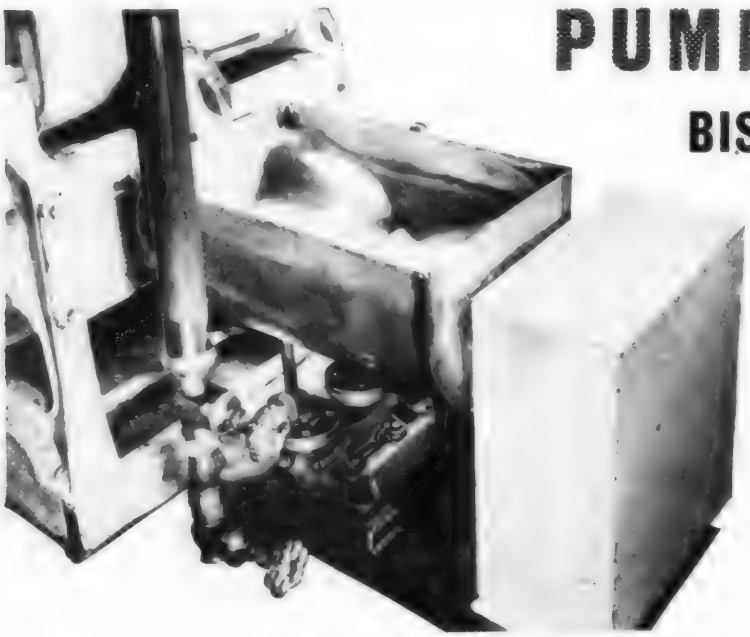

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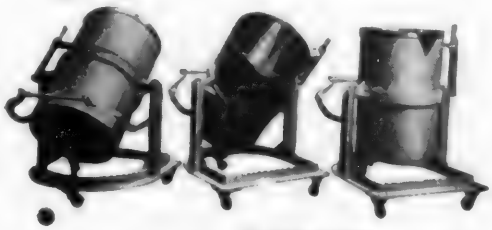

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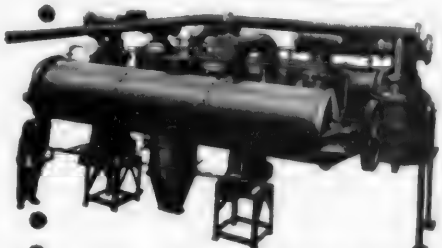

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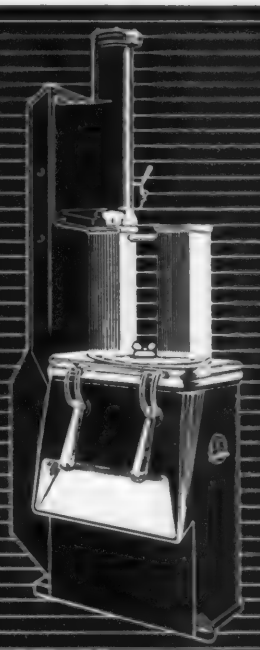

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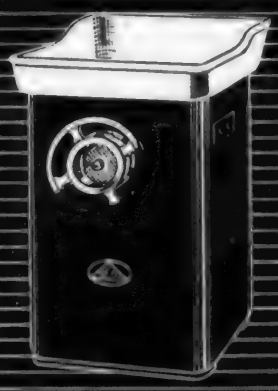

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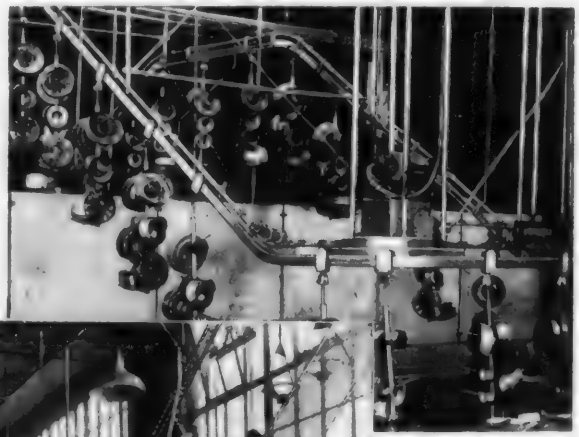

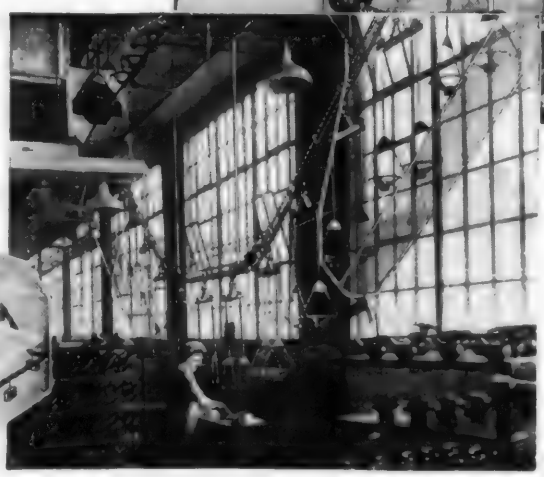

Above:
Teleflex conveyors form an important aspect of the production system of Messrs. A. C. Delco—Division of General Motors.

Left:
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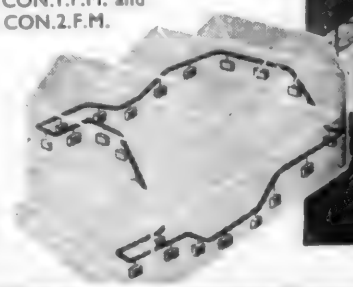

Right: An example of a Teleflex Conveyor which travels all round a particular factory.

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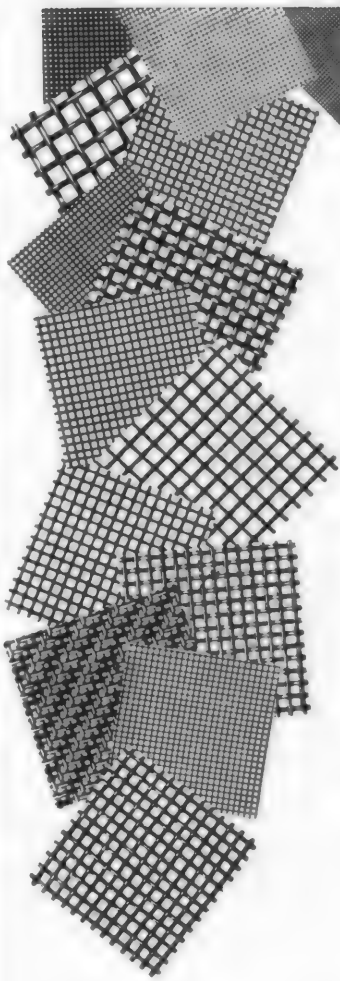

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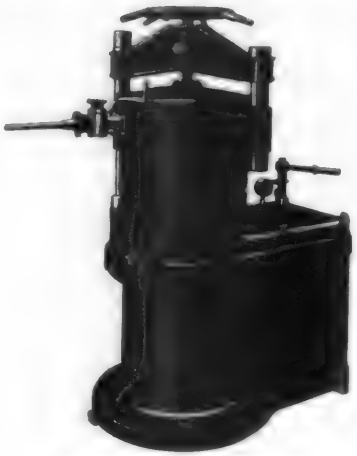

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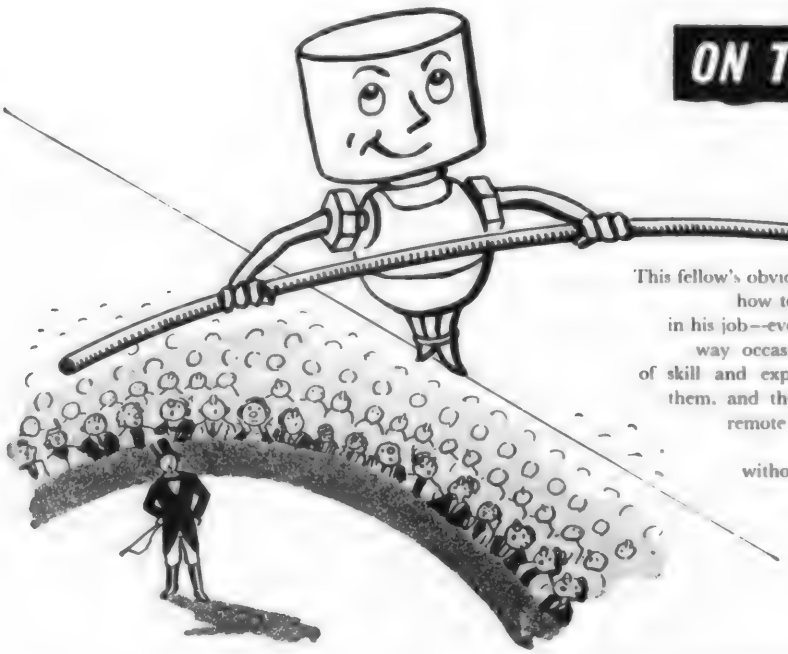

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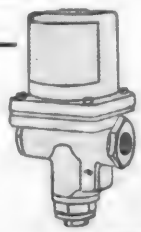

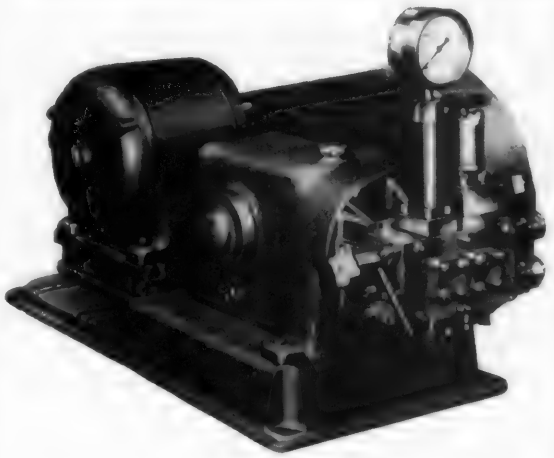

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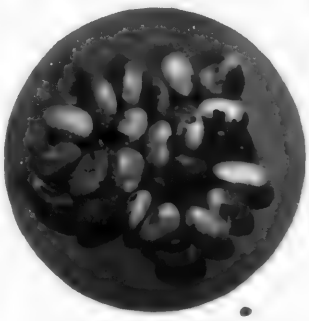

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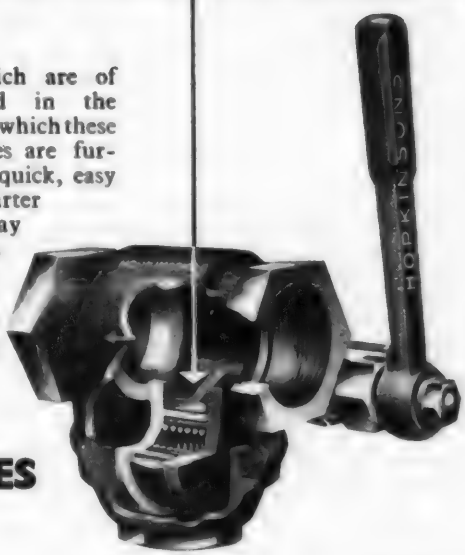

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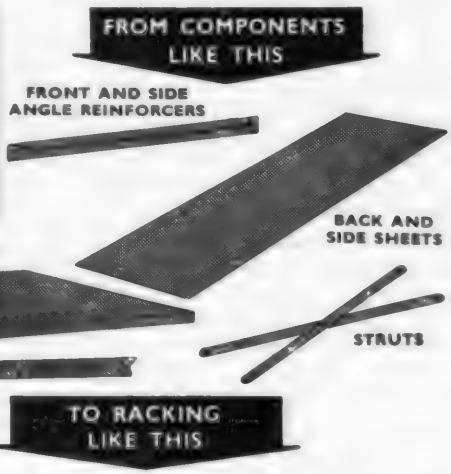

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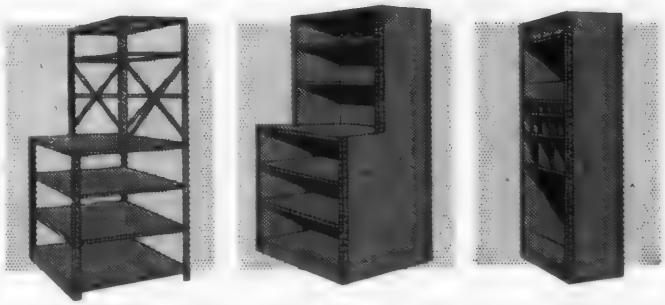

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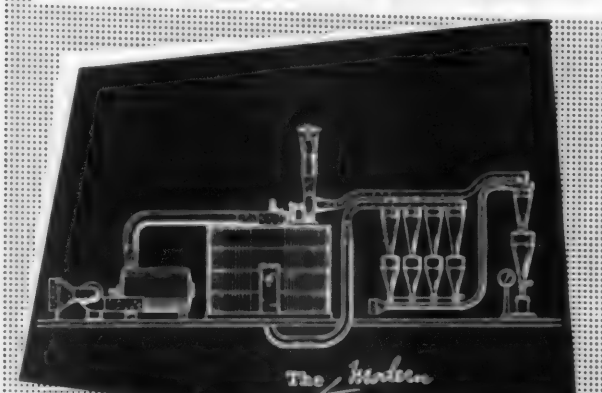

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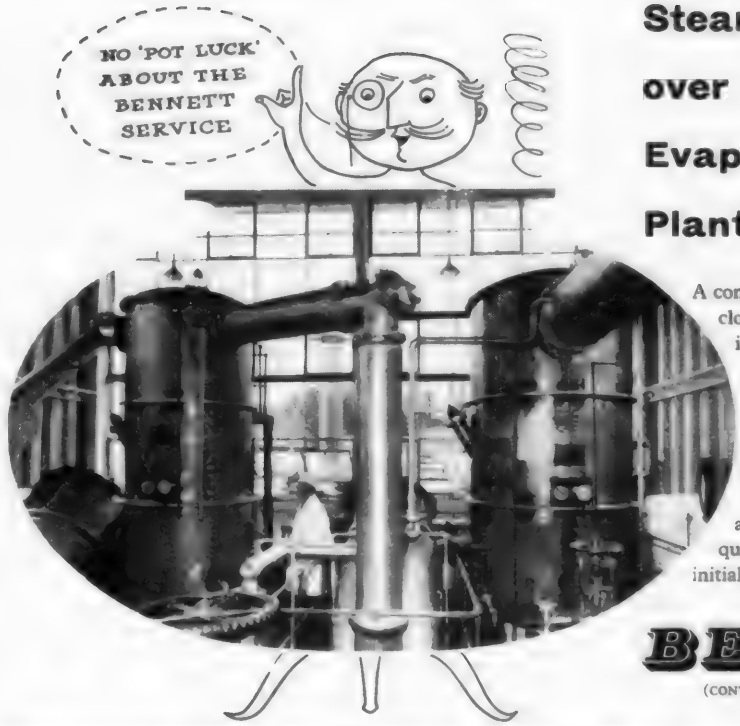

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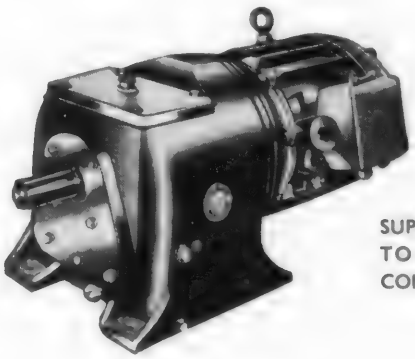

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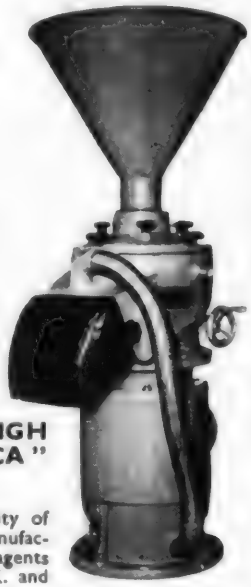

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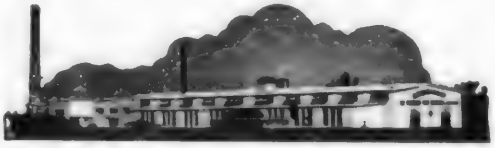

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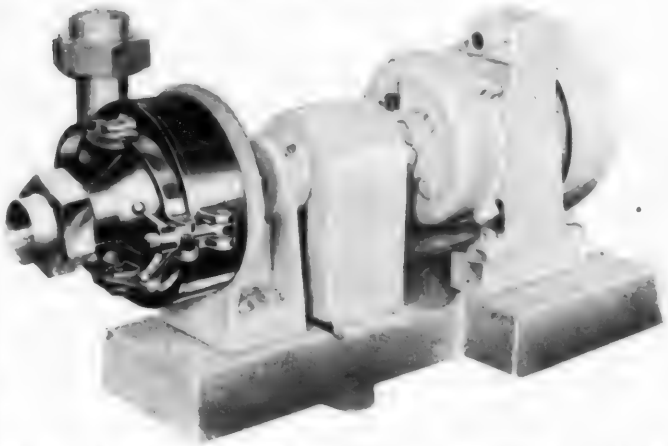

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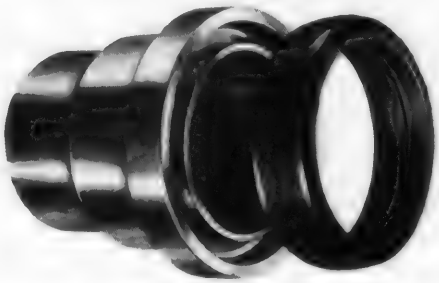

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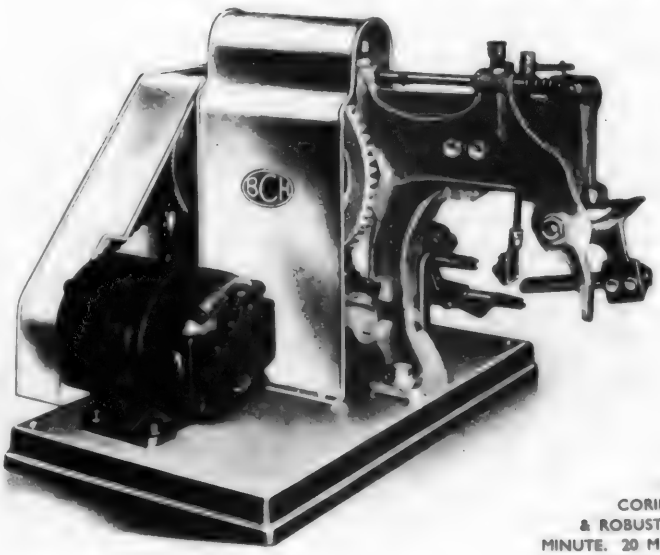

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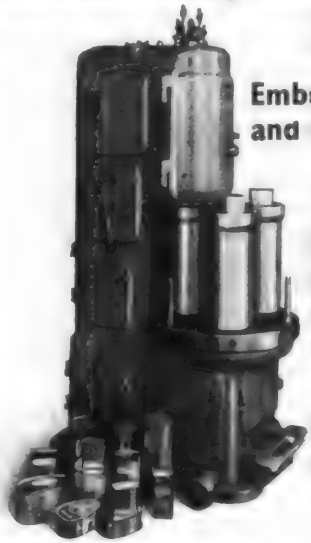

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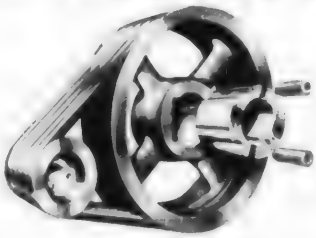

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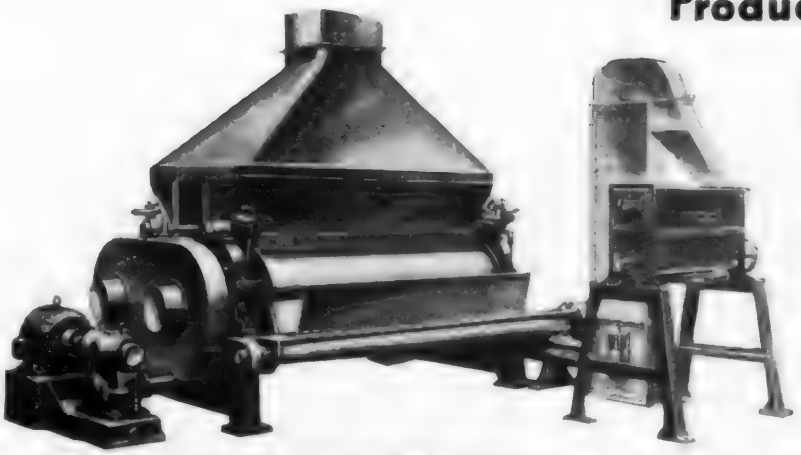

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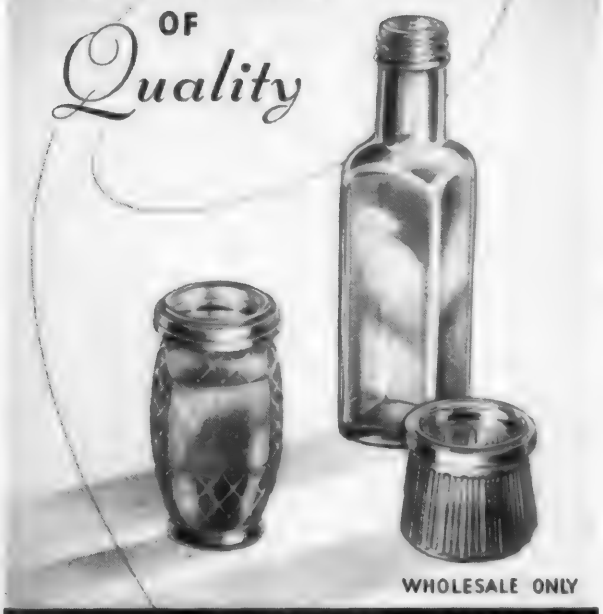

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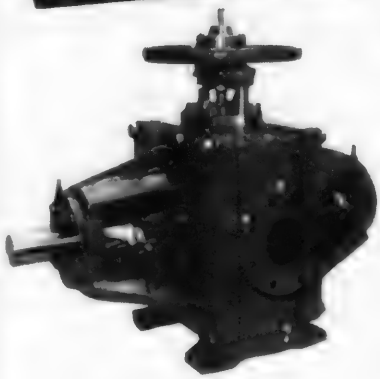

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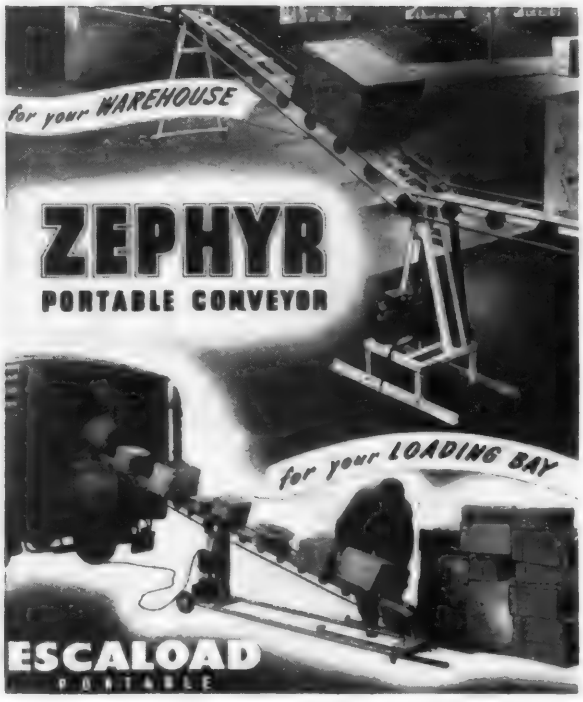

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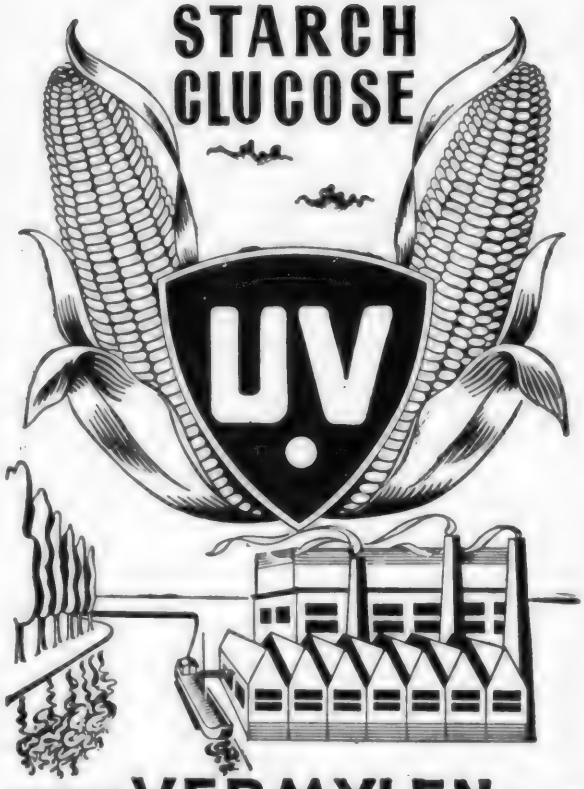

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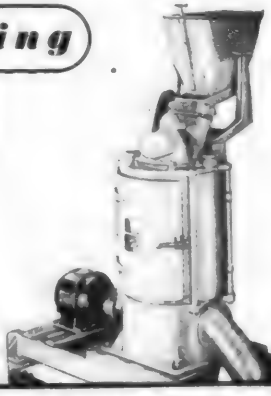

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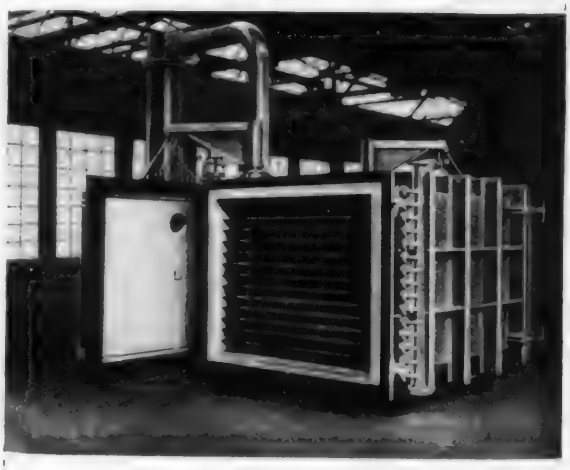

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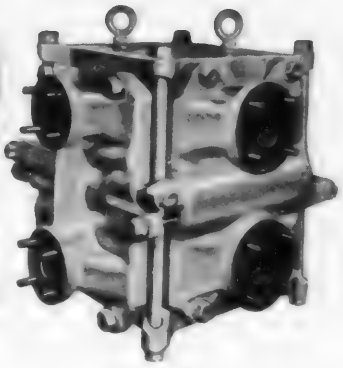

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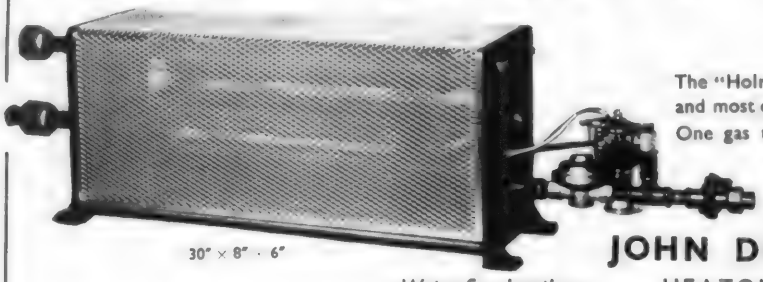

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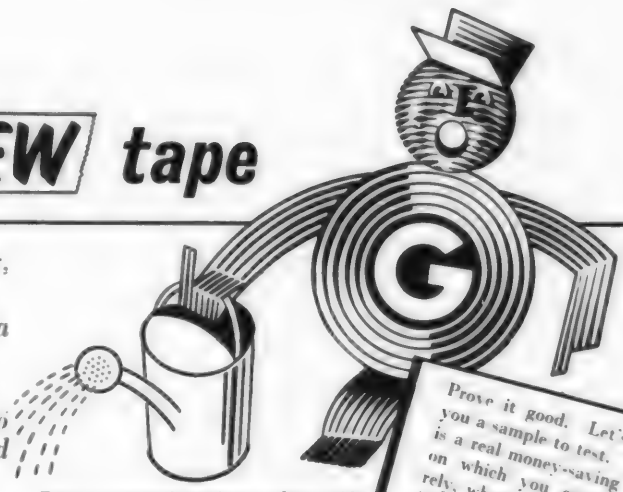

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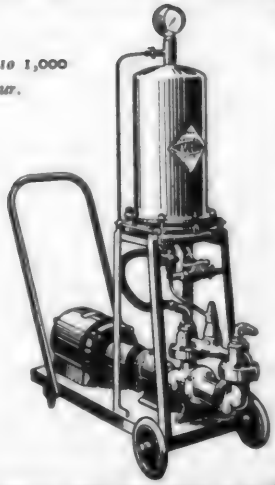

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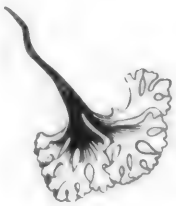

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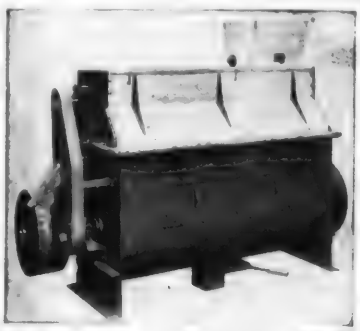

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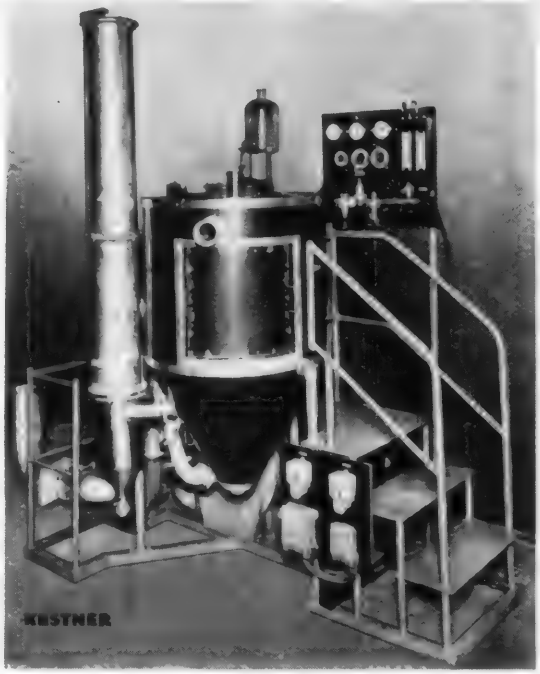

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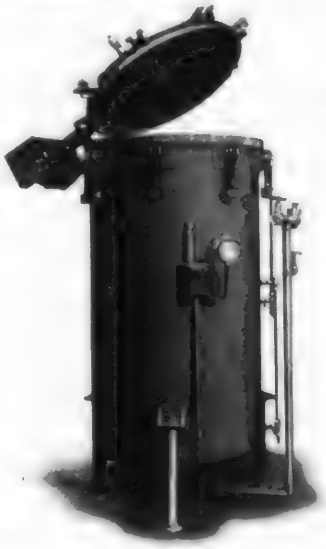

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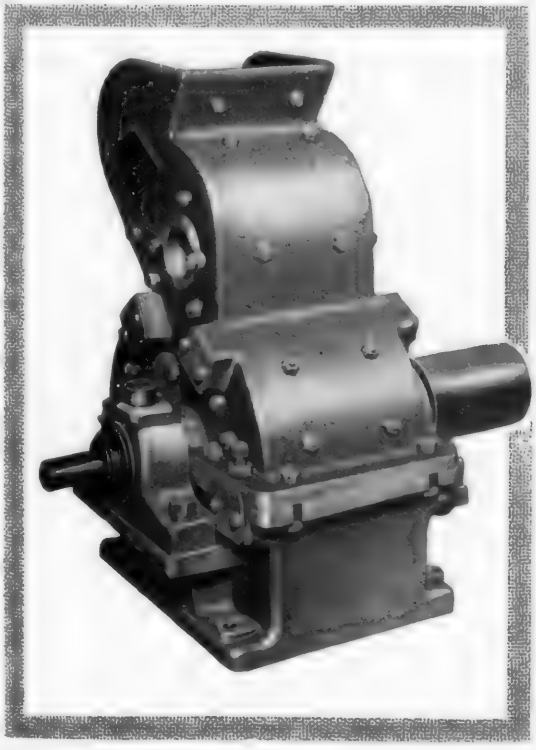

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THE UNIVERSITY OF LEEDS

APPLICATIONS are invited for Imperial Chemical Industries Limited Research Fellowships in Bacteriology, Biochemistry, Biomolecular Structure, Botany (Plant Biochemistry and Biophysics), Chemical Engineering, Chemistry, Chemistry of Leather Manufacture, Chemotherapy, Colour Chemistry and Dyeing, Engineering (Civil, Electrical or Mechanical), Fuel and Refractories, Geology (including Geochemistry), Metallurgy, Mining (Selective Flotation and Geophysical Surveying), Pharmacology, Physics, Physiology or Textile Industries (Protein Chemistry and Wool Textile Engineering). The Fellowships will be of an annual value within the range £600-£900 a year according to qualifications and experience and will normally be tenable for three years. Further particulars can be obtained on request.—Three copies of applications (one in the case of applicants from overseas), together with the names of two referees, should reach the Registrar, The University, Leeds, 2, not later than April 15, 1955.

BUSINESS OPPORTUNITIES

FOR SALE or to Lease in Northern Ireland. Manufacturers of Branded Goods selling in Northern Ireland or Eire would save considerably in freight by manufacturing on the spot. This is a fully equipped canning factory, 30,000 cans per day output. Situated close to rail and harbour. All services. Ample office accommodation. Large storage space. Excellent accommodation (close vicinity) available for managerial, etc., staff if desired. Inquirers should acquaint themselves with the Aid to Industry Scheme operating in Northern Ireland.—Principals only apply Box. B4900.

CANNED Goods Distributors with working connections throughout the country are interested in obtaining Sole Sales Agency for British Fruit and Vegetable Canners.—Apply Box B4904.

EXPORT Agents specialising in food products and raw materials for food manufacturing industries are able to carry one or two additional lines. For own account or on commission basis.—Interested parties please write to Box B4908.

MEDIUM Canner in north west wishes to place his services at the disposal of a larger canner, with a view to canning exclusively for him, all types of English or Foreign Fruits. Twelve months contract or longer essential.—Box B4910.

MANUFACTURERS, your labour-saving problems solved by special purpose machines designed by experienced Engineer of long standing, specialising on Food and Confectionery processing, packaging, and factory layout. Complete working drawings supplied, prompt service.—Box B4913.

PROCESSING capacity available, small factory, London area. Services available include steam, gas, electricity, water and cold storage. Homogeniser installed and steam-jacketed cooking vats.—Any proposition considered from genuine inquirers. Box B4914.

ONLY the original manufacturers can really recondition a machine as new, so when thinking of buying a second-hand Purdy Labelling Machine first contact The Purdy Machinery Company, Limited, 41-42, Prescot Street, E.1, Tel.: Royal 8401, who have, from time to time, completely rebuilt and fully guaranteed machines available.

FRUIT Canning Business offered complete or ne factory premises suitable other goods. Situated in excellent fruit growing area. Labour available, also good living accommodation.—Box B4876.

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4d. a word, minimum 10s.

Box numbers, 1s. extra.

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DE-GREASING and Cleaning Down! One man can do the work of five with B. and A. steam-cleaning-with-detergent equipment; ready for use from your own steam supply. "Speedylectric" high-efficiency steam lance; 30 ft. steam hose; 15 ft. detergent hose; £40 complete. Ideal for the Food industry.—Bastian and Allen Ltd., Leaflet L.30, Ferndale Terrace, Harrow, Middlesex.

SOUP and gravy-base formulae (dehydr.) marketed successfully in U.S. for sale in U.K. against Sterling.—Please write Box B4859.

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FULL Steam in five minutes with B. and A. Electrode Boilers, used by British industries for twenty years. No boilerhouse, no flue, no attendant needed. The most compact and convenient steam raisers available, can go beside machines using the steam.—Write for leaflet 125, Bastian and Allen Ltd., Ferndale Terrace, Harrow, Middlesex.

MISCELLANEOUS SALES

FOR SALE

CASINGS

The following lots of casings are offered, subject unsold. 950 bundles each × 22 yds., approx. of 105 m.m. Naluxin Casings inedible; 3600 packets each × 50 yds. of S.I. 19 m.m. Hypak Casings; 457 packets × 100 yds. S.I. 19 m.m. Hypak Casings. Advertiser is willing to accept offers for each of the foregoing lots which are surplus to his immediate requirements. The Hypak Casings are edible and each packet contains 9 unit spools packed in film. Offers will be accepted for all or part of the foregoing lots.

BOX No. B4915
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Stratford House,
Eden Street, London, N.W.1

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PRODUCTION Manager (42) with sound knowledge and experience of canning English fruits and vegetables. Pre-process and processing, handling and treatment. Able to take full control—Box B4911.

CHEMIST, 35, graduate, 14 years experience control, research and administration, 10 years foodstuffs industry, desires change; any responsible position where industry, reliability and experience fully utilised.—Box B4899.

FOOD Technologist (32) 10 years Production and Factory Management experience, canning and quick-freezing, meats, fruits, vegetables, fish and poultry, seeks similar position. Wide experience modern management techniques and food engineering.—Box B4912.

MISCELLANEOUS SALES

ONE CWT. drums Boake Roberts "Drydex" (Lemon Flavour) for sale.—Box B4917.

CULTIVATED Blackberries (quick frozen). Bargain for quick sale. Room required. Excellent for processing—Box B4897.

TWENTY tons Best Quality Beef Dripping in drums/casks available. Enquiries to Box B4898.

BARRELS. 55-gall. capacity Oak and Chestnut Barrels; 40 available weekly, used once only for Vermouth.—Borden, 3, Hall Place, W.2. Tel.: PAD. 6619.

APPLES for Canning, Jam and Mincemeat. 500 tons hand-picked Bramleys, machine graded 2½ in.-2¾ in.-3 in. to your requirements. Also Swedes and Carrots for Canning. We shall be pleased to submit keen quotations delivered to your factory in 6-ton loads on receipt of your enquiry.—Horace Sullivan Ltd., Fruit Merchants, 133, Widemarsh Street, Hereford. Tel.: 2532 (4 lines).

TEN tons Citric Acid B.P., 4 tons Tartaric Acid B.P. and 1 ton Refined Soya Lecithin 60% for sale.—Whitecourt Ltd., 21, Little Portland Street, London, W.1.

The Strongest Vanilla Flavour

VANOLEUM

1 oz. (2/6) makes a pint of essence
4 ozs. 8/6. ¼ lb. 10/6. 1 lb. 32/-

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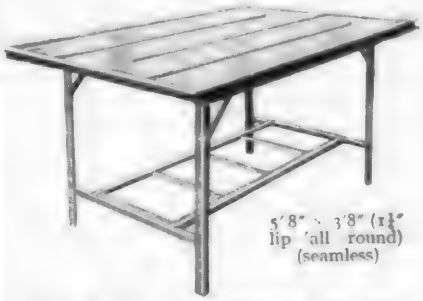
Factory Tables with
STAINLESS STEEL TABLE TOPS



5'8" × 3'8" (1¼" lip all round) (seamless)

Firth's Quality. "CORROSION AND ACID RESISTING THROUGHOUT." These Trays or Tops were originally designed for culturing Penicillin and are offered as being unused. They have three reeds running lengthwise; being seamless, there are no crevices into which waste materials can lodge. They are reinforced for heavy duty; undersides treated with rubberised solution to repel condensation. Each Tray weighs ½ cwt. Large numbers used in all branches of Food Processing. The finish is Industrial Bright-gloss with very slight defects. The underframes (sectional) are mild steel enamelled grey.

Price: Table Tops, £8, c.w.o.
Complete Tables. £17, c.w.o.

THOMAS HOGG, 31 Wellington Rd., Whalley Range, MANCHESTER 16. Phone: MOS 3072

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MISCELLANEOUS SALES

SALES outlet required for Instant Soup Concentrate to Caterers.—Box B4905.

SOUP. The Ministry of Food offers for sale by Tender a quantity of Soup Powders comprising about 200 tons Tomato, 200 tons Oxtail and 100 tons Green Pea, packed in 10-lb. square tins, four tins to a fibreboard case. These soups have been manufactured to special recipes for the Ministry of Food. Tender Forms, which may be obtained from the Ministry of Food, Miscellaneous Foods Division, Great Westminster House (Room 137), Horseferry Road, London, S.W.1 (Victoria 8511, Ext. 480), contain full details of the soup powders and the conditions under which they are being offered for sale. The closing date for receipt of completed Tender is April 2, 1955.

STAINLESS STEEL VESSELS

50/- each carriage paid in dozens

55/- each plus 2/6 carriage and packing smaller numbers.

Capacity 6 gallons.

16" × 11" × 11" deep.

Complete with lid as illustrated plus inner anti-splash lid. Handle swivels flat thus securing lids when in transit.

Ex M.O.S. constructed to usual high government specification.
Radius corners, 20 gauge 18/8 stainless steel, every vessel despatched in sound serviceable condition.

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Grove Green Road, London, E.11. LEYtonstone 1013

PLANT FOR SALE

£18 SAVED! Powerful motorised dust, fume Extractor-Blower Units, three-phase, £23. Single-phase, £25. Also few Brooks Cub ditto, £10. Numerous satisfied users.—Bellangers, 306, Holloway Road, London, N.7. Tel.: North 4117.

MEAT Cutting Electric Bandsaws. New high speed Machines for sale, stainless steel or wood table. Three sizes: 24 in., 30 in., 36 in. Maximum height of cut on 36 in. machines 19 in. 400/440/3-phase supply.—Photographs and prices available from makers: F. J. Edwards Ltd., 359, Euston Road, London, N.W.1. Tel.: EUSton 4681.

TWO Gardner, size "H," patent Rapid Sifting Machines, with 5 ft. screens. Worm bottom pattern. Fully motorised, with A.C. 3-phase motors, starters and isolators. Purchased new in 1952. Very good condition. One "Morton" Whisk, 50-gall. capacity. Monel-metal construction. Water-jacketed. Fully motorised with A.C. 3-phase motor and starter. Purchased new in 1951. Very good condition (little used). Three Southall and Smith Automatic Confectionery Weighing Machines. Fully automatic weighing and delivery, with hopper and elevators. Weighs in units from 1 oz. to 10 oz. Very rapid operation. Fully motorised. Purchased new in 1952. Very good condition.—Box B4901.

FLOWERS Labelling Machine, £140. Bancroft stainless Twin-head Liquid Filler, £90. Brandt Screw Capping Machine, £40. Southall and Smith Powder Weigher and Filler, £120. Several 3-phase and single-phase motors, new. 20-gall. and 30-gall. gas Boiling Pans, £20.—May be seen working. View by appointment. H. Crosbie Cole, 2/4, Hereford Road, Southport.

TWO second-hand Baker-Green Cutting Machines, 26 in. wide; non-embossing type. One second-hand Gillespie Cylindrical Mixer, two-sack capacity, fitted with three-speed gear. One second-hand horizontal riveted steel steam jacketed Fat Mixer; 21 in. diam. by 3 ft. 6 in. long internally. One second-hand Picket Trough, unjacketed and galvanised with 9 ft. hollow shaft for heating or cooling. —Carr and Co. Ltd., Biscuit Manufacturers, Carlisle.

CREAMERY Package 400 g.p.h. s.s. Multiflo two-stage Plate Cooler. Brand new and unused.—Box B4903.

HOMOGENISER, 200 g.p.h. Creamery Package as new. Cost £750. Will accept £350.—Avery, Willow Restaurant, London Colney, Herts. Tel.: Bowmans Green 2113.

UNUSED Imperial Vacuum Drum Filters, approx. 6 ft. 6 in. diam. by 6 ft. 6 in. long, approx. 130 sq. ft. filtering surface, with motor-driven rotary vacuum pump, filtrate and wash water receivers. Motorised.—Apply Box B4909.

BARRON Powder sifting and mixing machine, "I" size, 10-cwt. capacity with brush sifter, vee belt drive and 10 h.p. A.C. motor. Perfect condition.—Details from C. Skerman and Sons Ltd., 118, Putney Bridge Road, London, S.W.15. Tel.: Vandyke 2406.

CONCHES. Two 20-cwt. Lehmann belt-driven four-pot Conches for sale. Both with granite beds and granite rollers. Can be seen working. —G. F. Lovell and Co. Ltd., Rexville, Newport, Mon.

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1 CHLORINE PANEL, by Paterson. Complete with pressure gauge, piping, injections and Booster Unit with motor.

For Deodorization and Air Purification:

1 4-TUBE OZONIZER, by Paterson, Output 6 gm. per hr. Blower output 200 cu. ft. per hr., with ¾ in. bore tubes. 4 Spare Dielectrics.

7 MOLONISER-OZONAIR UNITS, Type No. 203. Self-contained units for air purification.

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HOMOGENISERS, several sizes; also stainless steel Tanks, good condition.—Box B4893.

ONE double "Z" armed Mixer, 33 in. by 33 in. by 25 in. deep, motorised 440/3/50, with safety guard complete. One Low and Duff steam jacketed Boiling Pan, 30 in. diam. by 24 in. deep, with retractable stirring gear, motorised 440/3/50; w.p. 60 p.s.i. One brand new Morton latest model self-discharging twin-screw Mixing Machine; 10 cwt. capacity; complete with 15 h.p. 400/440/3/50 electric motor and starter. Two complete Lightfoot Refrigerating Plants, approximately 120,000 B.T.Us./hr. each; with motors 440/3/50. All in first class condition.—Box B4894.

FIVE-GALL. gas-heated Pan. Stirrers lift out of mixer; 15-gall. copper, jacketed tilting Pan, double acting stirrers; 30-gall. Monel, jacketed tilting Pan, double acting Monel stirrers; Cochran-Kirke Sinuflo G.F. Boiler, modern, fully automatic, 1,300 lb. p.h., 4 ft. 6 in. diam. by 7 ft. 6 in. high; Mikro Pulverizer, 12 in., complete grinding unit; No. 3 Kek Mill, new condition.—Box B4873.

COMBINED Sifting and Mixing Machines, sizes 5 cwt. and 3 cwt. ex stock.—Makers: D. Burr and Son Ltd., Drayton Place, West Croydon.

Powell & Co., 'Drum Master' Works, Burry Port, Carms

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GARDNER or Pascall 150-lb. motorised (240V/AC) Sifter Mixer; also Satona Carton Heat-Sealer. First-class condition essential. 56 lb. by 1 oz. Factory Platform Scales—Box B4896.

56 lb. Crypto Potato Peeler wanted in good condition, 250 volts single-phase. State price. —Reply Tudor Food Products, Sandyford Road, Newcastle-upon-Tyne.

B.C.H. 15 in. or 12 in. stainless steel Pulping and Sieving Machine. Also B.C.H. No. 2 heavy duty Jelly Cutter.—Please send details of condition and price to Box B4906.

BROAD Bean Podder required. Must be in good condition. Minimum output shelled beans 25 cwt. per hour.—Fullest details and price to Box B4919.

VERTICAL Hydraulic Press required for Fruit Juice Extraction. Capacity about 100 gall. per hour.—Fullest details and price to Box B4920.

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I BUY discontinued lines, old stocks, small or large lots, canned goods, chocolates, sweets, groceries, biscuits, hardware, chemist's sundries, polishes, soap powders, fancy tins, cardboard boxes for packing chocolates, sweets.—Paul, 413, Bury New-road, Salford, 7. Tel.: Broughton 2700.

MEDICAL bottles; tablet bottles; jars; bottle closures, bakelite and metal purchased. Best prices paid.—Samples and full details in first instance to Noel Davold and Co., 9, Laurence Pountney Lane, Cannon Street, London, E.C.4. Tel.: MANsion House 3951-2.

DAMAGED or redundant stocks of food, residues or by-products in large or small quantities required.—Send your offers to Rotunda Foods Co., London Office: 50/52, Blandford Street, W.1. Tel.: Welbeck 8465.

REQUIRED redundant Wooden Boxes, Cases, Bottle Crates and Containers in large quantities.—Full particulars price etc., to Silverdale Box Supplies Ltd., Burgess Hill, Sussex. Tel.: 3485.

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Phone 98 Staines

5 in. gunmetal jacketed Extruder. Set of three (elec. driven) Drop Rolls 400/3/50. Perkins twin blade Dough Mixer, 30 in. by 30 in. by 24 in., 415/3/50, 10 h.p.; ditto, 28 in. by 32 in. by 24 in. Barron "U" trough Mixer, 7 ft. 6 in. by 2 ft. by 2 ft.; ditto, 6 ft. by 2 ft. by 2 ft., 5 ft. by 19 in. by 20 in. and 4 ft. by 2 ft. by 2 ft. 6 in. Also many Sifter/Mixers. Four unused welded steel jac. Tanks, 15 ft. by 4 ft. by 4 ft., 10 lb. w.p Modern elec. Bowl Mixers by Morton, 80-, 40-, and 10-quart. Jacketed Pans and Mixers up to 300 gall. "Dragee" Pan, 36 in. by 18 in. (elec. driven). Jac. cyl. Ovens, 8 ft. by 5 ft., 8 ft. by 4 ft., 7 ft. by 3 ft. 6 in., 7 ft. by 3 ft. and 43 in. by 17 in. (unused). Battery of three s.s. jac. Pans (gas heated), 18 in. by 15 in. Cyl. enc. Pressure Tanks, 2,400 gall. each 7 ft. 8 in. by 9 ft. 4 in. long. Autoclaves and retorts, filter presses, pumps, ovens, dryers, boilers, hydros, grinders. conches, chocolate plant, presses, mincers, tanks up to 44,000 galls.—Harry H. Gardam and Co. Ltd., Staines.

TWO Young Patent Filling Machines with tubes for 4oz./2lb. in various weights.—Box B4918.

"DIANA" Meat or Vegetable Dicing Machines with twin pots, 1½ h.p., 400V., 3-phase, £200. —Box B4924.

PEERLESS Depositor. Phosphor-bronze moving parts. In working order. Fills cans, jars, etc. £150. Purdy New World Labeller for labelling cans, jars, bottles, etc. £150.—Warrington Canners Ltd., Penketh, Warrington.

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Horiz. steam jacketed Vacuum Drier by Passburg, approx. 23 ft. long by 4 ft. diam. fitted gear-driven revolving reel of ten 4 in. diam. steel tubes surrounding central tube heated by live steam with intermediate paddles fitted for agitation. Steam jacket, w.p. 2 ats., batch type, mounted on three cradles and fitted two discharge openings with lever-operated doors. Complete with condenser, all fittings, horiz. wet vacuum pump.

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Six new vacuum Drying Ovens of mild steel welded construction, approx. 7 ft. long by 3 ft. 6 in. wide by 3 ft. 6 in. deep, fitted nine steam-heated shelves to carry thirty-six acid resisting metal trays, 36 in. long by 16 in. wide by 1¾ in. deep. Davit swung door at each end, with hand wheel closing mechanism. Complete with motor driven horizontal wet vacuum pump, pressure and vacuum gauges, metal trays and connecting pipe.

Vertical open top Mixer by Kellie, 2 ft. 6 in. diam. by 1 ft. 10 in. deep, 50 gall. capacity. 16G F.D.P. stainless steel, lined with monel metal coil heating, and 1¼ in. centre outlet. M.S. mixer body mounted on four tubular legs, stainless steel fittings, and horizontal three-arm nickel silver agitator running at 31 r.p.m. driven by A.C. motor.

Vertical Cake Mixers by Peerless, 80 qt. capacity, four-speed machine, with bowl, whisk, beater. Direct drive by 5 h.p. motor.

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PURDY "World" Bottle Labelling Machine. "Beth" Automatic Can Labelling Machine. B.C.H. 8 in. stainless steel Pulping and Sieving Machine. Morton 80-qt., three-speed Mixing Machine. "Gravfil" four-head stainless steel vacuum Liquid Filling Machine. Bancroft two-head stainless steel vacuum Liquid Filling Machine. "Gravfil" motorised Screw Cap Tightening Machine. Alite, Type "LF" Loose Powder Filling Machine.—Apply C. Skerman and Sons Ltd., 118, Putney Bridge Road, London, S.W.15. Tel.: Vandyke 2406.

FONDANT or Nougat Mixing Machine by B.C.H., all copper, steam jacketed, motorised. Bottle Filling Machines for vacuum operation, two-head, stainless contact parts. Gardner Powder Sifter/Mixers combined. Copper jacketed Tilting Pan. Reasonable prices for early sale.—Welding, Son and Co., Saxone Buildings., Tarleton Street., Liverpool, 1.

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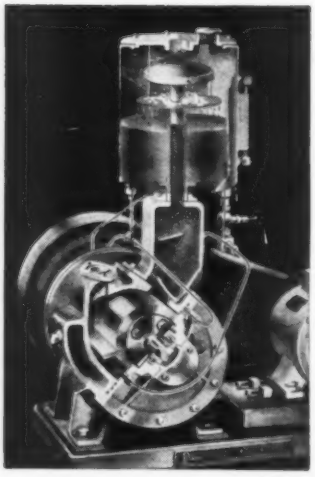

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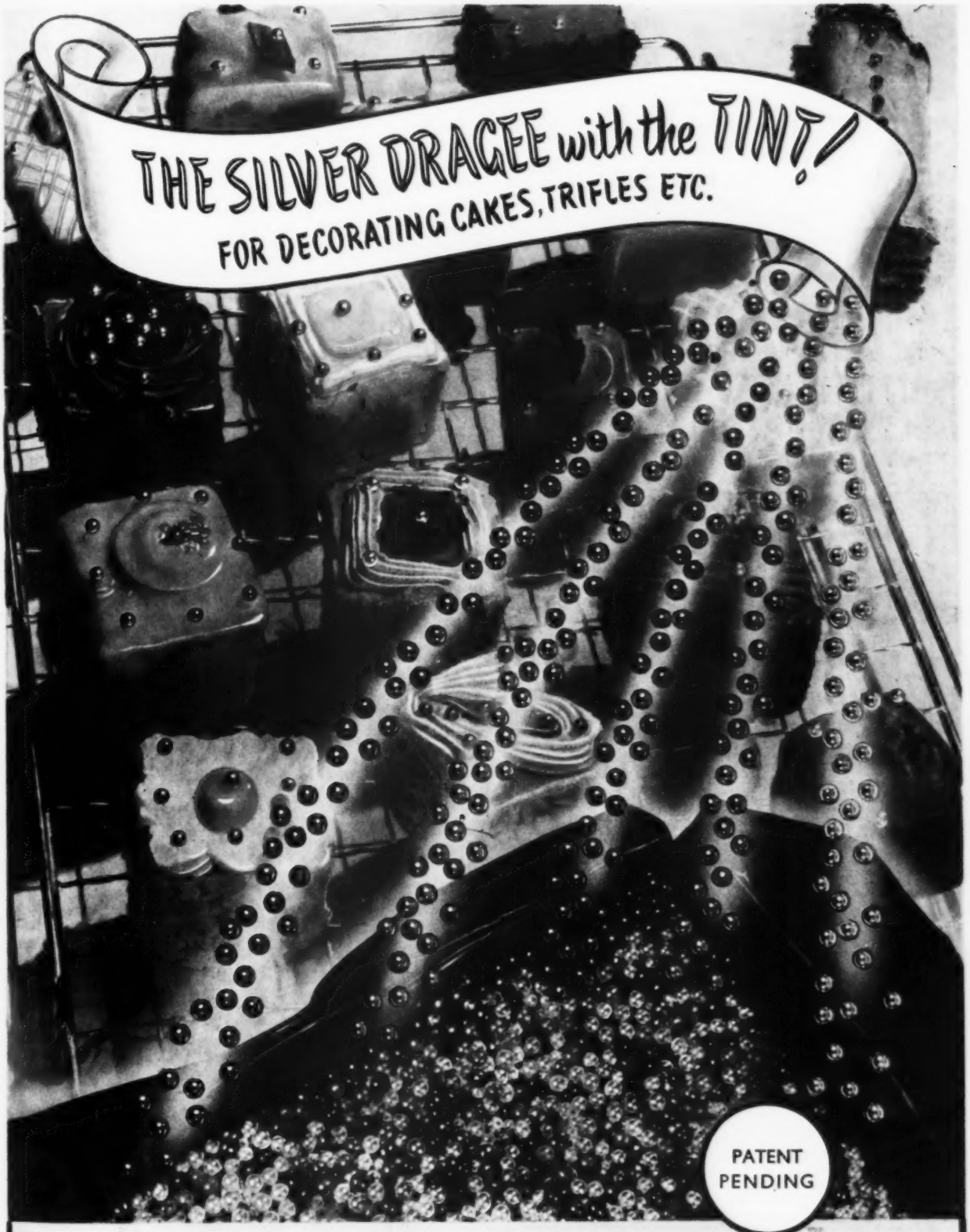

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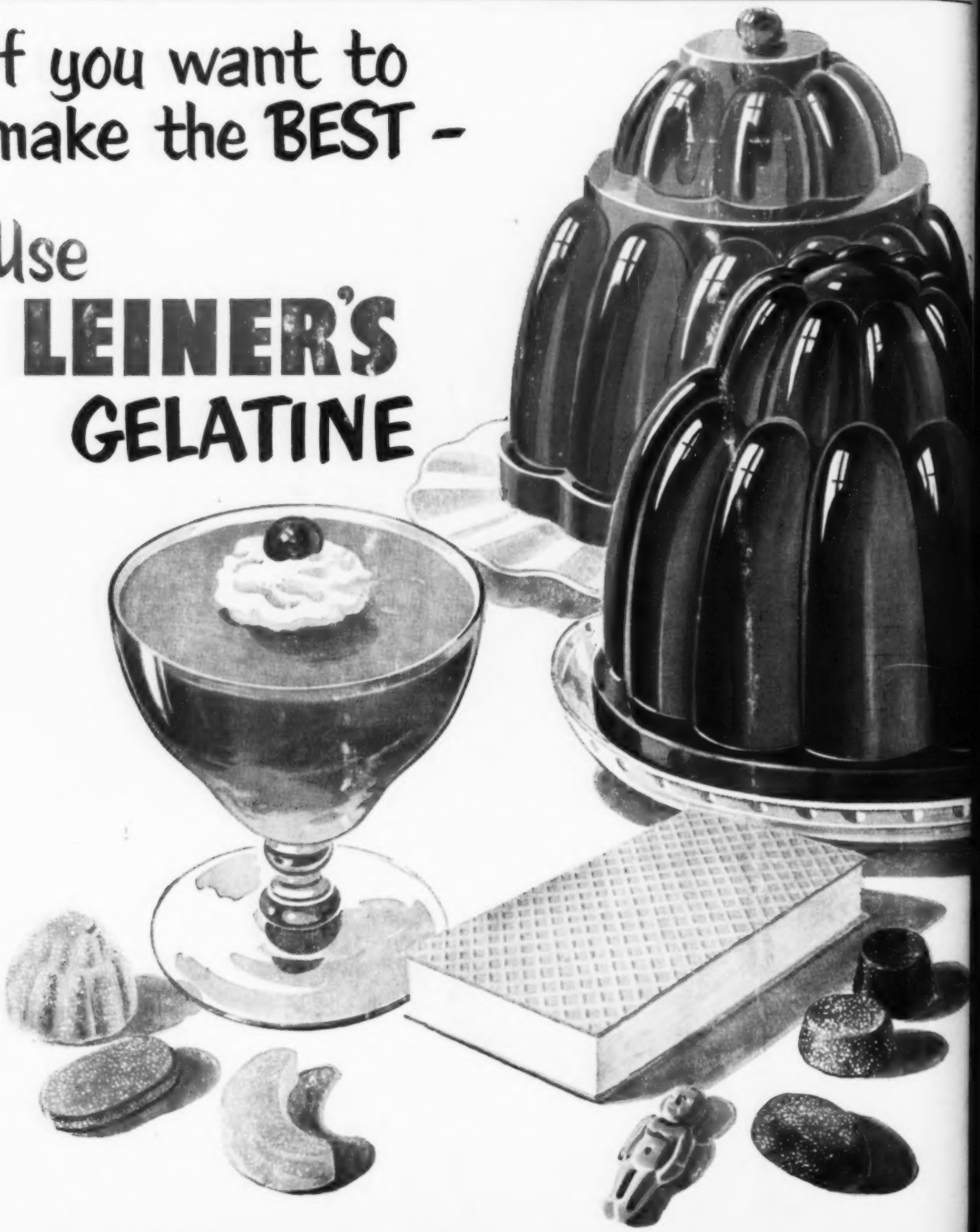

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